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ABSTRACT

Two issues of this serial include the following articles: "Editorial Note for Semiotics Issue" (Pedro Portes); "Qualitative Postmodernism and the Nature of Teaching and Learning" (Gary Shank); "Instructional Prescriptions Can Be Hazardous to Your Pedagogy!" (Donald J. Cunningham, Bruce Allen Knight, and Kathy K. Watson); "Toward a Mutual Interplay Between Psychology and Semiotics" (Alfred Lang); "Semiotics and the Deconstruction of Conceptual Learning" (J. L. Lemke); "Effectiveness of Accelerated Learning as a Tool to Facilitate a Maintenance Paradigm Shift" (Aaron B. Clevenson); "The Effectiveness of Suggestive Accelerative Learning Techniques Applied in Teaching Underprepared College Freshmen at a Two-Year Technical School" (Vera Ann Confer-Owens); "Video-Taped Instruction Creates Listening and Visual Memory Integration for Higher Reading and Math Scores" (Jan Erland); "Suggestopedia and Neurolinguistic Programming: Introduction to Whole Brain Teaching and Psychotherapy" (Daya Singh Sandu, Ed.); "Suggestology and NLP: Are There Similarities?" (Harry E. Stanton); "Neuro Linguistic Programming: A Pre-clinical Experience in Educational Psyhology" (Robert E. Saltmarsh); "Identification of Primary Representational Systems: A Validation of the Eye Movements Model of Neurolinguistic Programming" (Daya Singh Sandhu and Lina Yuk-Shui Fong); "Neurolinguistic Programming: Magic or Myth?" (Marcus Jacques Choi Tye); "School Stress and the Theatre" (Harry E. Stanton); "Methodological Considerations in Multicultural Research" (Robert Rueda); "The Atmosphere Factor" (Rosella R. Wallace); "The Tiger on the Stairway" (Donald H. Schuster); "Recent Research in Second Language Acquisition Supporting Accelerated Learning Techniques" (Wendy Whitacre); and "Book Review of Eric Jensen's "'The Learning Brain'" (Lyelle Palmer). There is a brief summary in Spanish at the end of each article. (Articles contain references.) (NAV)

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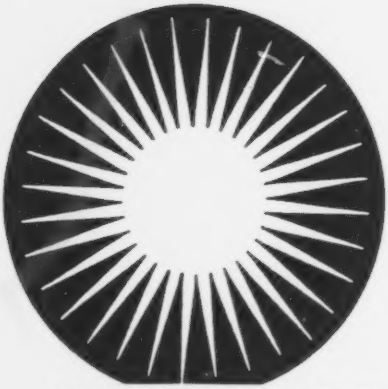

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Volume 19, Issue #1 Spring, 1994

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From the Editor: This Special Issue on Semiotics presents a radical shift for the journal as it attempts to broaden its base, motives for being and goals. The unfamiliar fare the issue offers may likely be left undigested by many of our readers attuned to suggestopedia at first sight. However, a closer look at the threat that semiotics (the general theory of signs, symbols and semantics) poses to many as a part of postmodern discourse reveals that some important connections remain within our reach.

First, why should a special issue of this sort be presented in the first place? What does it have to do with advancing the activities of learning and teaching? How does it fit within a periodical that is concerned with ways to improve pedagogy? The first part of the answer is that semiotics raises questions about the very worth of what is taught. Do abstract concepts exist in reality, or are they simply the construction of a collective of knowers? If the latter is true, why concern ourselves about accelerating the acquisition of arbitrary knowledge which is useful in only some contexts?

Secondly, this new perspective is healthy in forcing social scientists to examine some of the assumptions inherent in their work. Postmodernism creates an imbalance or cognitive dissonance that must be resolved. Thus it invites changes in perspectives and critical analysis of one's assumptions. Resolving such cognitive dissonance is important in advancing our intellectual development it would seem.

Thirdly, it is interesting that semiotics in education, a part of the postmodern "bandwagon" ridden by increasing numbers of disaffected and anti-reductionistic folks, employs suggestion for conversion purposes like any other model. Beyond the concern of how humans derive meaning through signs and symbols, which appears as a more fundamental question than how we speed up the process of meaning-making in education, we find the issue of how do paradigms emerge, such as behaviorism, suggestology, critical pedagogy or cybernetics. How is it that the discourse of a minority becomes amplified and competes with others in gaining a market share of the public's cognition or perhaps conation? If all knowledge is relative and its truth lies in numbers, then how do some competing concepts prevail and become institutionalized even when these arise from a small community of scholars? Is it because the latter have a clearer understanding of objective truths?

Postmodernism is a threat to those who think that objective realities can be frozen and studied, and eventually that such research can improve our practices. For instance, we may

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strive to understand how the brain works and responds to a variety of instructional methods. This endeavor can result in improved methods of learning and teaching. How do we know? By controlling and testing variables and replicating results. If we can devise a satellite technology that may tell folks in Iowa that it is raining in Paris, or ways to test for schizophrenia *a priori* to such "behavior's" being manifested, we are logical positivists out of the modernism of the "past". If we find a way to make the brain work more effectively in information processing, whether through genetic engineering, chemical or social agents, we are still modernists. The Lemke paper in this issue will suggest that we may never really know objective truths after the mighty "logic" of the discourse by Foucault, Derrida and others. A closer look at this dialectic reveals that the postmodernists are engaging in a very persuasive sort of suggestion derived from the artistic freedom enjoyed in the arts and letters, and their methods of study. The very term "post-modern" suggests that those who are not post-modern in their thinking most likely are modern and most importantly, that they are out of step and behind the times in their view of the world. Thus, the suggestive element of this "new" story or discourse may be thus uncovered.

The other papers in this collection each have their own unique way of challenging the comfort to our balanced cognitive structures. And so it is that this journal hopes to continue as a forum for the exchange of ideas rather than their ritualization. From time to time, it may be useful to be exposed to other world views that in different ways may foster our cognitive growth. Finally, I would like to invite readers to submit their rejoinders to unorthodox discourses such as the one embodied in this issue in the future. It is in this way that *JALT* may continue to find its niche as a semiotic device into the 21st century. -- Pedro Portes.

Journal of Accelerative Lerning and Teaching, 19(1), 1994

Qualitative Postmodernism and the Nature of Teaching and Learning

Gary Shank
Northern Illinois University

Abstract. Present day critical issues are examined for their relevance to instruction and instructional design; the issues are: How to use postmodernism to enhance understanding of learning and teaching, how semiotics and psychology can integrate to study learning and teaching, and how can these ideas be applied to instructional design? This approach lets us ask new questions and thus possibly gather new insights to teaching and learning research.

* * *   * * *   * * *

Introduction. In this issue of JSALT, we have been given the opportunity to set up a forum for examining the potential of semiotic and other postmodern concepts for psychology in general, and the arts of learning and teaching in particular. The following three papers do so admirably. The role of my paper is to answer the age old question of "Why should I listen to what you have to say in the first place?"

Another way to look at the matter is to ask "What is the point of considering semiotic and other postmodern ideas in the areas of learning and teaching?" That is the question I will attempt to answer.

The first reason that we need to consider postmodern ideas is the fact that we are living in a postmodern world. Lyotard (1979) described the postmodern condition as the case where "grand narratives," or large overarching understandings on the culture, no longer hold. The grand narratives have been fragmented into sets of complementary, orthogonal, or competing versions of the culture. In fact, a person can break off and live within a fragment of the total culture, having only minimal contact with other segments of the culture, without being a hermit, a freak, or an outcast.

For instance, I can turn to Sportschannel and ESPN and spend all my TV leisure hours watching sports. Or I could watch old movies exclusively, or nature channels, or whatever. Or I could plug into Compuserve or Internet, and spend my time navigating the Net.

In any of these cases, I can organize my consciousness around the tenets of the computer culture, or the sports culture, or the nature culture, or whatever, and still go to work everyday and appear, and actually be, a fully operational and socialized member of society. I'm just living in one of the many fragmented worlds that in fact make up the loose confederation of consciousness of our society. And if we are going to try to educate people in this culture, then we had better know what culture contexts they adopt, how they understand the world within those contexts, and how to reach them efficiently and effectively.

Jay Lemke, in the last article, leads us through the sometimes confusing welter of ideas and movements that comprise postmodernism. We can keep these ideas straight if we remember that there are really four cardinal points in the postmodern landscape: structuralism, post-structuralism, phenomenology, and semiotics. Furthermore, we can keep these dimensions straight when we remember that structuralism and post-structuralism are focused on the role of language as a model for knowing the world, while phenomenology and semiotics can be described as the "sciences of meaning."

To these poles of language and meaning, Lemke adds the further psychological dimension of human action, to come up with a social semiotics of teaching and learning. This social semiotic model focuses on the idea of the social construction of meaning as the linchpin of the entire educational process.

As these ideas are developed, Lemke gives us a glimpse of what a social semiotically informed teaching-learning system would look like.

Another reason that we might take a postmodern turn in our examination of teaching and learning would be the desire to build upon and even replace current conceptual frameworks that help describe and define the psychology of teaching and learning. The available choices for modeling the basic teaching-learning process tend to fall into the behavioral domain, the physiological domain, or the "personal-constructs"/"depth-psychology" domain. Each of these areas has the drawback of depending upon the Cartesian model of the mind's existing within the physical body. One of the most interesting aspects of postmodernism is its tendency to move away from this Cartesian perspective, toward a world where psychological phenomena are seen to exist in their own right in the realm between the mental and the physical.

Alfred Lang, in the third paper, takes a closer look at a more general and broadly defined model of semiotics that goes beyond the Cartesian framework, and the role that this model could play in helping us expand our notion of the psychology of learning and teaching. He shows us how his model of semiotics, based on the work of Charles Peirce, is distinct from other understandings of semiotics that focus more on issues of classification of signs, determining the meaning of signs, of the use of signs as communication tools.

The Peircean model is more of an evolutionary model, in that it holds that systems of signs grow, expand, and evolve. This growth model of semiotics is the perfect vehicle, according to Lang, to create the kind of post Cartesian model of causality that is needed for a genuine science of psychology that does not depend on either a materialistic or a subjective version of reality. Or, as Lang put it in one of his headers, it gives us the chance to "take seriously the reality of interpretation."

By following the path that he lays out, argues Lang, both psychology and semiotics can benefit. Psychology can be expanded as a science to include those acts which seem to be the most human, including talking, thinking, and the various social negotiations that make any human institution, including education, possible. At the same time, semiotics, by utilizing this more sophisticated model of psychology, can incorporate directly those issues derived by psychology as being empirical facts about the operation of human beings working within their various cultural milieus. Keeping this interplay going will then allow each field not only to grow, but to gain a richer and deeper identity.

In the second paper, we have an applied example of many of the ideas laid out in theoretical detail in the earlier papers. Donald Cunningham and his co-authors address an issue that Cunningham has pursued for a number of years -- how can we use the ideas of semiotics to enhance our understanding of pedagogy in general. Following the work of Lakoff & Johnson (1980), they have focused on the types of metaphors that are instantiated in the educational process.

Public compulsory education, particularly in the West, has evolved according to a "factory" metaphor. By this, I mean that public education operates "as if" educated students were the final product of this process, where teachers dispense knowledge to them and then test the acquisition of knowledge as a sort of "quality control" to make sure that the final product, or the educated student, meets strict criteria.

The "factory," or more precisely the "industrial," metaphor has been responsible for creating a system of prescriptions about how to run the "educational process" more smoothly, more efficiently, more cost effectively, or what have you. In working against this metaphor, Cunningham et al.

realize the need to work against the basic idea of a dependence on prescriptions in the first place. However, they also realize the need to be able to offer a framework for education so as to allow teachers and other educators to work within the confines of a broadly conceived common vision.

As an alternative they offer, instead of prescriptions, a series of principles about how students can construct knowledge themselves, about paying attention to the contexts and individualistic conditions of the construction of knowledge by students, and about empowering learners by helping them gain conceptual tools and self-reflection about the learning process itself. The efficiency and effectiveness of instructional design models based on the factory metaphor are thereby replaced by a new, self-directed and constructive instructional design, one that gets the students to do most of the work.

Each of the papers addresses a critical issue -- how can we use postmodernism to enhance understanding of learning and teaching, how can semiotics and psychology work together to create the kind of science of the human condition that we have never had in order to study learning and teaching properly, and how can these ideas be applied to real educational concerns, such as instructional design? I would like to address one issue myself, to help further the overall project -- how can we use an inquiry of understanding to help expand what we mean by learning and teaching in the first place? In other words, how can we forge a qualitative postmodern understanding of the nature of learning and teaching?

For the past ten years, I have been fascinated with the operation of abductive logic, and its role in postmodern and semiotic inquiry (Shank, 1988; Shank, 1987). Abduction, which in its contemporary form can be traced back to Peirce (1955), is the form of logic that allows us to go from a raw experience to settling the meaning of that experience as a case or example of some process or principle that we already know or understand. In other words, abduction is the logic whereby we create hypotheses to come up with the best explanation of a given situation (cf. Fann, 1970; Hanson, 1958; Kapitan, 1990; for a look at some of the current views of the nature of abduction).

When Peirce first developed the notion of abduction, he was concerned with explaining how we move from a strange and puzzling state of affairs to a situation where we feel that we understand what is going on. But I feel that, by focusing on the role of abduction in dealing with strange and puzzling cases, Peirce failed to see one very important point:

the act of attempting to determine what the particular means in a general context of meaning is the basic default act of cognition. In other words, abduction is the fundamental and unreflective "ground state" of cognition. As such, then, abduction becomes the most prevalent type of inference we perform. Because it is so prevalent and unreflective, we lose track of its operation.

Developing a type of inquiry that depends on the reflective and deliberate use of abduction is akin to developing an awareness of the world for fish that requires them to pay attention to the fact that they live in the water. Fortunately, we humans live in multiple cultures and sub-cultures, each of which has its own unreflective understanding of the world. Therefore, the path to creating a general model of inquiry is eased considerably by the realization that each human situation has its own quality of existence, and that, given our sensitivity to the postmodern fragmentation of our culture, we can use that sensitivity and fragmentation to track down all sorts of the "surprises" in understanding that would cause us to shift from an unreflective and automatic abductive "read" of a situation to a deliberate and reflective study of the matters at hand in order to gain further insight.

Let me give an example. Suppose we go over to the home of our "ESPN Sports Junky" to watch the Chicago Cubs on TV. Andre Dawson, who incidentally is no longer with the team, comes to bat. Our friend starts initiating the "salaam" salute to the television, explaining that he is a Cubs fan. For the uninitiated spectator, this display makes no sense. Is Dawson a black muslim? Is our friend crazy? Is this some special ritual for Dawson whose origin is shrouded in baseball lore? Our friend is not sure. He just knows that, whenever Dawson came to bat, the camera invariably showed a shot of fans salaaming to Dawson at the plate. To us as inquirers, this means that we have a topic for an inquiry into understanding, if we choose to pursue it. We could interview fans. We could search archival records. We could offer hypotheses. All of this leads not to the quantitative increase in knowledge, but a qualitative increase in understanding of one aspect of our fragmented and postmodern culture. But by focusing on the "reading" of the matter at hand, by looking at the signs, or the semiotic configuration of the situation, we can in principle work back and forth between a quantitative accumulation of knowledge and a qualitative reading of the understanding of the situation. That is, our semiotic framework allows for complementation, rather than competition, between these two views of inquiry (Shank, 1990).

In the final analysis, the strength of the postmodern approach in general, and its semiotic manifestation in particular, is that it allows us to ask new questions, and garner new insights using new approaches to inquiry. Therefore, to foster that process for the readers of this journal, let me stop now and invite the reader to wade into the articles waiting ahead. It may be exciting and at times frustrating, and even a bit bewildering, but hardly boring. This is certainly a breath of fresh air in much of the arena of human science research today.

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Resumen. Ciertas cuestionas se preguntan por su relación al diseño de la enseñanza: Como el postmodernismo puede mejorar el entender de aprendizaje y enseñanza; Como semiótica y psicología pueden integrarse para estudiar aprendizaje y enseñanza; y Como se pueden estas ideas aplicarse al diseño de la enseñanza?

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Instructional Prescriptions Can be Hazardous to Your Pedagogy!

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&
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Abstract. Common educational practices as prescriptions for teaching are listed, reviewed and criticized. In contrast, semiotic constructivist theory is advanced whereby learners come to understand their world. But in conclusion, the only prescription offered is that making-prescriptions can be hazardous to your pedagogy.

*** *** ***

A common theme in the rhetoric of educators is that education and the disciplines from which it draws support are basically prescriptive, providing answers to questions such as "what sorts of teaching enhance learning for what sorts of pupils?". For instance, Royer (1992, p. 258) asserts

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that "Education is basically a prescriptive enterprise". Others go even further, asserting that the teaching/learning process is amenable to some version of an engineering solution, where efficiency and effectiveness can be optimised by some careful matching of pupil to teaching method:

> *Educational psychology addresses issues of both science and engineering. As science, educational psychology tackles the task of describing, explaining and predicting the nature of knowledge, learning and instruction. Engineering is a field that seeks to apply theoretical knowledge to practical concerns. In a metaphorical sense, applied fields such as medicine, computer science, counseling and clinical psychology, and education, can be considered engineering. As a field of engineering, educational psychology undertakes to prescribe the process under which instruction impacts learning (Hegland and Andre, 1992, p. 226)*

This view is ubiquitous. Our textbooks, our teacher training curricula, our representations to the public, and so forth are almost entirely based upon the notion that educational research will produce generalisations that can be used rather directly to optimise learning. Sometimes these generalisations (or enduring truths, as we like to call them) are, in the vernacular of the Analysis of Variance, main effects - for example, pupils should be required to make active responses during learning. Sometimes we qualify the rule as an interaction - for example, highly anxious students perform best in structured environments whereas low anxious students do well in less structured settings.

Theories which represent extreme versions of this view are to be found in the world of instructional design and development. Distinguished educators such as Gagne (1985), Merrill (1983), and Reigeluth (1983) have argued persuasively for and have proposed models of instruction that, in contrast to the descriptive science of psychology, are prescriptive. In this view, unless our scientific endeavours lead to clear rules or principles for educational practice, then we are shirking our responsibilities as psychologists dedicated to the improvement of educational practice. Even Jerome Bruner (1967), normally thought of as a critic of the engineering approach, has argued that instructional theory must be prescriptive; that is, provide specific recommendations for educational application.

While the prescriptive view seems to be taken for granted in many circles, we would like to point out that it is one view among many potential views and based upon a number of assumptions which are, at the very least, debatable. Some of these assumptions include the following:

1. Knowledge is external to a learner and can be represented in some format akin to a task analysis or semantic map. Our job as educators is therefore to package this knowledge in some optimal format.

2. Instruction is primarily a process of efficient communication where knowledge in this optimum format is efficiently and effectively transferred to the pupil.

3. The effectiveness of the teaching/learning process is best measured by assessing the success of this communication process, whether the knowledge as pre-specified has been acquired by the pupil.

4. The context in which learning should take place is that which minimises disruptions to the communication process - for example, where students can concentrate without distraction. The context *per se* is

irrelevant to the knowledge being acquired.

5. At its heart, learning is an abstractive process. Concrete experience is very useful in illustrating the abstractions and algorithms which make up mature thought, but it is abstractions which free one from the immediacy of experience and allow generalised thought. These abstractions are most conveniently represented in linguistic and/or mathematical codes. In the long run, these abstractions are capable of being simulated on a computer.

6. Tools such as computers and calculators can assist the knowledge communication process, taking over such aspects that are inconvenient for or not well suited to the human teacher.

7. Learning is fundamentally an individual act and is best conceptualised from an individual perspective. Group learning may sometimes be an effective pedagogical strategy, but nothing more. In instruction we are dealing with individual selves, not collectives.

8. Knowledge of efficient strategies for storing, retrieving and processing information can help the learner optimise the communication process.

Other assumptions consistent with this view could be cited, but a comprehensive listing is beyond the purposes of this paper. If premises such as these are accepted, then we agree that a prescriptive approach to instruction is not only desirable but mandatory. If we can reliably identify some bit of knowledge as a concept, for example, then a prescription like "Give at least three positive and three negative examples to teach a concept" is entirely appropriate. The dream of some day having a manual of instructional prescriptions available to meet the pressing needs of educators, while yet a long way off, is attainable in principle, under these assumptions.

Earlier we proposed that these assumptions are debatable; in fact, we would claim that if these assumptions are replaced by other equally defensible assumptions, those derived from the emerging social constructivist/ semiotic view of learning, quite a different picture emerges. The purpose of education shifts from a prescriptive engineering enterprise to a craft, guided but not controlled by a broad perspective, where the task of instruction is to provide support and opportunities, not prediction and control. Let's examine some of these assumptions and explore their relevance for the general area of literacy.

Semiotic/Constructivist Models

In recent papers (Knuth & Cunningham, 1991; Cunningham, 1992) the first author has presented alternative descriptions of semiotic/ constructivist models of instruction. In brief, these models assume that instruction is more a matter of nurturing the ongoing processes whereby learners ordinarily and naturally come to understand the world in which they live. In this view, knowledge is an active process of construction or semiosis, not the receipt of information from external sources.

The role of teaching and other instructional media shifts from one that seeks to maximise the communication of fixed content and/or skills to one in which students are led to experience the knowledge construction process in a variety of sign systems and with a variety of tools to construct interpretations, appreciate multiple perspectives, develop and defend their own positions while recognising other views, and become aware of and able to manipulate the knowledge construction process itself. An important aspect of this approach is the insistence that learning take place embedded in the contexts to which it is most relevant in everyday life and with which the students are personally involved.

We will not repeat the descriptions of those models here. In the remainder of the paper, we would like to list some of the fundamental assumptions of semiotic/constructivist theory and illustrate the kinds of applications which might be derived from such assumptions. But we hope it is clear that such applications are illustrations of using the assumptions as a mindset, not as prescriptions which should necessarily be applied in every context with every student.

1. **All knowledge is constructed; hence instruction should provide experience with the construction process.**

The constructedness of our worlds is usually invisible to us in our ordinary daily interactions. By inviting students to adopt the perspectives and roles of a variety of individuals, we attempt to show them that different people can have different views of a situation and that these views can have a sense or logic independent of their own views. Truths that the students hold are shown to be only one of many possible truths.

A rather interesting way to provide such experience is to introduce the concept of metaphor. Lakoff and Johnson (1980) have argued convincingly that much, perhaps all of our thinking is metaphorical in nature. The strategy is to probe a student's existing metaphor for a particular situation, then show how changing the metaphor can change one's view of that situation. For instance, many teachers and students tend to view the classroom as a workplace, where tasks have to be completed in exchange for some sort of reward (e.g., a good grade in the course). Even the language we use to talk about classrooms is embued with this metaphor: homework, classroom management, reading gains, teacher accountability, and so forth. In consequence, learning tends to be regarded as a phenomenon that takes place in classrooms, not elsewhere, much as work takes place in the workplace.

But suppose we adopt a different metaphor, say, the classroom as providing a consulting service. Rather than promoting the teacher as an authority figure, being the source of all information and having finite answers, a facilitory role is adopted. For example, in a situation where students are involved in the writing process, students will be engaged in simultaneous activities such as brain-storming ideas, editing, writing, and conferencing. The teacher as facilitator is involved in advising, suggesting, and listening to students, rather than as being the fountain of all knowledge. No doubt you can think of other differences that would emerge from such a shift in metaphor. Our point simply is that under constructivism, a primary aim is to provide the students the opportunity to experience the constructedness of their world view.

2. Many worlds can be constructed, hence there will be multiple perspectives.

The notion that we make sense of the world by interpretations that reflect our beliefs, expectations and past experiences leads directly to the issue that no one else sees the world exactly as we do. Instead of assuming there is a fixed reference point (i.e., an external world) to which we can anchor our knowledge in order to affirm its validity, we have to accept the fact that our experience will be a mixture of stability and change, of regularity and conflict.

In constructivist instructional design, our aim is to find a way to create mutual understandings that accommodate or at least reflect the views of others. Few issues in the world have a single "correct" resolution. But young children (and many adults as well) tend to think that knowledge is either right or wrong, that all valid questions have answers, that authority figures (e.g., teachers, textbooks, etc.) have the answers to these questions and that experts know the truth or have ways to figure it out (Perry, 1970).

Fundamental under constructivism is the development of a realisation that our view is only *one* of many and that an attitude of acceptance toward other views allows for the growth of our views. Therefore, instruction designed under constructivist influences should reveal the process of knowledge construction, that any "truth" begins with a set of untested assumptions that can be examined to evaluate the adequacy of a position taken. What we take as "true" in any situation is very much a product of a process of negotiation, often taking the form of some sort of dialogue. Positions arise from assumptions and are something we commit ourselves to, not something we adopt because (or certainly not only because) an authority figure decrees that we must.

Within classroom contexts many opportunities exist which will expose multiple perspectives of understanding. Discussions reflecting individual perspectives or interpretations will promote creative thinking and the construction of flexible understanding. Often students are involved in interpretation of text which would involve analysis, evaluation and synthesis of information. The process of using existing knowledge to interpret text to construct personal meaning involves understanding information in the text as well as modifying knowledge used to understand text in the first place.

Multiple perspectives are most commonly encountered in dialogue with other individuals. Certainly not all forms of dialogue will accomplish this goal. What we are interested in here is the situation where a group member is willing to reconsider personal beliefs to accommodate a conflicting viewpoint. Cooperative learning activities incorporate negotiation as a strategy to deal with conflicting opinions. This process of negotiation includes clarifying and confirming the other person's position to discover common ground while the group dynamics of these activities offer a situation that enhances intellectual and social development.

3. Knowledge is effective action, hence learning should occur in its relevant context.

According to Maturana, "every act of knowing brings forth a world ... [so] all doing is knowing and all knowing is doing". (Maturana & Varela, 1987, p. 26). This is a key point. Knowledge is effective action. We observers regard an action as effective in a particular context. There is no real distinction between knowing and doing. The environment does not cause behaviour, it only triggers it based upon the structural coupling between the organism and the environment.

This idea resonates nicely with the notion of situated cognition that is so passionately endorsed in the educational literature today (e.g., Brown, Collins, & Duguid, 1989). So much of what passes for education these days is relevant only to a single context - the school. Study after study shows a lack of transfer of knowledge acquired in the classroom to the real world (e.g., Bransford et al., 1990). Thus, while some students may be capable of decoding words and reading them in isolation, they are unable to "read" and make sense of the same words in a meaningful text. Instruction derived from a constructivist framework must be designed to address issues and be embedded in contexts with which the students are familiar and about which they care. So much of what we ask students to learn is of *our* choosing. They experience little ownership of the ideas, little sense that they are an active participant in their own learning processes. We feel that the students must come to feel some personal sense of responsibility for the products of their thinking, where their views are heard and respected by others in the situation. In other words, students must come to see that the tasks they are performing will help them accomplish the things they want, will empower them to take more complete control over their lives, to know how they know. In essence, we are suggesting that the children become the observers of their own behaviour, the judge of the extent to which their knowledge is effective action. A classroom environment should be established which encourages students to be active agents in their own learning. For example, if students were permitted to negotiate a piece of writing to be published (including topic, genre, length etc.) in a class newsletter, then it is more likely that they would claim ownership of the completed work. Similarly, students taking responsibility for an amount and type of reading completed during a set period of time promotes students' empowerment of this particular aspect of their learning.

4. Human learning is embedded within social contexts; hence instruction should emphasise the social dimension.

The importance of discussion and dialogue for instructional design has been recognised recently with the rediscovery of Vygotsky's (Vygotsky, 1978) views of cognitive development and Freire's (Freire, 1970) pedagogical writings (see Cunningham, 1992, for an elaboration of this point). Many of the examples given so far have focused on dialogue as an important pedagogical strategy for constructivist instructional design. This is no accident because dialogue is a major medium for providing experience in the knowledge construction process. While the individual learner is the only one who can construct his or her unique understanding of the world, this understanding emerges in a social context. It is only when we share knowledge, that its constructedness becomes apparent.

Concepts take on meaning through a process of social negotiation. The differentiations that a person makes in the world (mother versus father, democracy versus dictatorship, etc.) arise from the contrast of one thing with another in some sort of social experience. Language is the key to understanding the development of these processes in humans.

While it is possible to "have a conversation" with oneself (and even desirable in some circumstances), dialogue between individuals is the primary mechanism that allows the social construction of meaning. According to Vygotsky, it is the internalisation of social speech into inner speech, that is, the ability to engage in a socially appropriate dialogue with oneself, that allows one to plan and monitor cognitive progress. Inner speech, Vygotsky maintains, is developed by participating in social dialogue.

Cooperative learning situations encourage positive dialogue by making cooperative skills explicit so that students practice observing, providing appropriate feedback and reflection during conversations. The roles are formalised for students participating in group dialogue so that they can fully participate in leadership roles such as: observer, summariser, recorder, encourager, clarifier, organiser, challenger, questioner and predictor. This structure provides social contexts for students to explore different viewpoints, perspectives and positions and learn skills of negotiation and mediation and be aware of ways to reach consensus. Learning situations such as these promote inquiry and investigation and help students see a variety of perspectives, manage differences and solve problems by providing opportunities to brainstorm (all ideas accepted), clarify (elaborate, confirm, points of view), negotiate (solutions and consequences) and organise and record information. "What makes us human is the way in which we interact with other persons, and we learn how to interact within the groups, in which we are socialised and educated." (Johnson & Johnson, 1981, p. 459)

Collaborative learning fosters discussions that allow different points of view, a clash of minds, exchange of ideas, which all contribute to the development of creative thinking and deeper levels of understanding.

5. Knowing is not sign dependent; hence instruction should make available a variety of representational codes.

Learning and cognition, and ultimately living, is always embedded within a social context mediated, in part, through language. In addition to language, however, human interaction also involves the formation and interpretation of other complex sign systems (e.g., speech, gestures, writing, music, etc.). We use *many* sign systems to socially construct our world (Goolishian & Winderman, 1988) , a world in which we come to believe in the objectivity of our observations.

Multiple sign systems should be exploited in terms of what they can contribute to the knowledge construction process. Students need many concrete opportunities to explore their world and to translate those experiences to other forms of expression. Guessing, estimating and predicting are a vital part of logical thinking. Therefore, investigations using concrete materials which requires individual experimentation with the world, help children clarify and strengthen their reasoning abilities by talking about strategies, manipulating materials and documenting results. Children need enough time to play around with investigations to build their intuitive strategy making abilities. After plenty of concrete, tactile exploration teachers can begin posing questions to prompt predictions, such as, "What would happen if....? What would be a good strategy for me to try now?"

Verbalisation of reasoning processes is important because often children can solve an easy problem but be at a total loss about a similar problem in a different situation or with different numbers. By describing a process while manipulating concrete materials the child becomes conscious of the strategy and this awareness allows the strategy to become transferable - to be used in other situations (with practice and encouragement).

Within the computer context, for example, many modes of representation can be captured (e.g., graphics, photographs, animation, video, sound, etc.) and each of these can be assessed in terms of what they can reveal and what they might obscure.

In another example, Michael Roth (1990) makes sure that his science students experience multiple ways of representing their experiences while conducting laboratory experiments (e.g., verbal description, equations, pictures and diagrams, demonstrations, tables of numbers, graphs, etc.), all the while encouraging them to point out the strengths and weaknesses of each mode, what is foregrounded in one representation, obscured in another.

The important point to stress here, is that the use of varieties of sign systems can enhance still further our understanding of the constructedness of knowledge, the value of considering multiple perspectives, and so on for each of the other principles listed here. No doubt we become aware of and reflect upon these factors in large part through language but language is only one part of the meaning making process.

6. World views can be explored and changed with tools.

Writing long before the advent of computers, Vygotsky (1978) defined tools as "mediating" devices that allow humans to manipulate their physical world for the purposes of labour. According to this definition, the object of tool use is always external to the user. On the other hand, that which is used by humans to purposefully affect one psychologically is designated by Vygotsky (1978) as a "sign." For example, when one ties a knot in a handkerchief as reminder to do something, the person has created a sign that is intended to affect the person psychologically, i.e., to remember something.

According to Vygotsky, the characteristic common to both tool and sign use is their mediating nature. In order to achieve a physical goal, humans use tools to mediate its achievement. (Except for the most rudimentary tasks such as digging in the sand with one's hand as a "tool", all physical goals require the mediating use of tools.) Similarly, signs act as mediators for mental activity; that is, activity that would be nearly impossible (or at least significantly more difficult) without employing signs. Further, the creation and use of sign systems (such as certain computer applications) allow humans to engage in mental activity not otherwise possible (Pea, 1985).

One distinct difference between tools and signs should be highlighted. That is the cause-effect relationship of the mediating device to the intended object. Signs work only if the observer has prior experience and knowledge of the sign system. An Eskimo who has never been to a city might notice a traffic light changing colour but have no idea of what it signifies. In other words, the Eskimo, due to history, is not structurally coupled with that particular sign system.

Thus, as Maturana points out, the sign does not instruct the observer; any response is determined entirely by the structure and history of the observer. Whether or not the sign has its intended effect is solely determined by the Eskimo's ability to perceive the sign in conjunction with his prior knowledge of and experience with traffic light sign systems.

Perhaps it was because, during his time, tools were used almost exclusively for physical labour and signs for mental activity, that Vygotsky was adamant about their distinction. Since the mid-fifties, however, the nature of work (at least in western nations) has shifted from industrial to informational. The object of labour is no longer predominantly physical, but rather has shifted toward the various means and purposes of knowledge development. Because of this qualitative change in labour, its requisite change in the nature of tools, and the ubiquitous use of sign systems, we have broadened Vygotsky's definition of tool to include all mediating devices that can potentially affect both physical and mental activity.

The notion of tool is a powerful one for children to explore. When the things we ask students to learn, even such basics as reading and writing, are thought of as tools to accomplish goals rather than as tasks to be mastered, the motivation to learn becomes integrated within the tool use. Reading becomes a tool that enables you to find out more about things that interest you, not a task that must be mastered because the teacher says so. In other words learning to use a tool becomes instrumental in the context of a task, not a task itself. How much longer will we continue to teach tool use like keyboard skills, computer programming, visual arts, etc. as tasks in themselves rather than as tools which allow the accomplishment of deeply felt and self chosen goals?

7. Knowing how we know is the ultimate human accomplishment.

This is perhaps the most important principle of all and has naturally arisen in discussion of previous goals. Providing experience in the knowledge construction process is an important goal, but the outcome we hope will eventually occur is awareness of the constructedness of much of our knowledge and active control over that construction process: To know how we know. In other places (e.g., Cunningham, 1992) this has been referred to as the development of reflexivity. There is no higher educational goal.

If reflexivity were to come to serve as a primary goal in our school curricula, the subject matter of each of our courses would be the mind itself. A course in history would emphasise not simply history, but how historians know, the sign structures or systems of belief that historians use in their discipline, and skills and tools used to construct knowledge. What are the potential effects of those beliefs on the historical analyses that are regarded as acceptable? Or take physics. How do our assumptions about the nature of matter influence our experimental methodologies, and vice versa? How do the various forms of representing our knowledge of the universe influence our theories?

One consequence of an emphasis on reflexivity in our courses would be to coalesce the various subject matters, revealing the unity underlying them and rendering their separate treatment ill advised. More classes would be taught by teams of teachers, say a mathematician, a geographer, and a historian. The systems of belief of each of these disciplines could be juxtaposed so that, for example, the logic used to fashion some particular analysis could be examined against the tools provided by another discipline.

One hears quite a lot these days about the development of critical thinking and reflection in students, and we would agree with this emphasis. But we want to stress that reflexivity is not a skill existing independently of the learner that must somehow be transferred inside (e.g., the SQR3 method of reading, the method of loci, etc.). Rather we argue that reflexivity must emerge naturally as a function of all the other principles we have mentioned (experience of constructedness, multiple perspectives, tool use, etc.).

Conclusion

In this paper, we have argued for a point of view that denies the possibility that specific concrete prescriptions for educational practice are useful or even possible. We reject the notion that it will ever be possible to control the learning environment in democratic societies so that predictable outcomes of the sort necessary for learning prescriptions will occur. But the alternative is not chaos or total lack of control. The alternative requires a deep understanding of the process of semiosis, of the means by which humans ordinarily and naturally come to construct and understand their worlds. When this process is understood, it can serve as a framework or perspective within which teachers can operate to nurture ongoing processes of semiosis. Rather than prescriptions, we educationalists can offer frameworks like the theoretical principles cited above, tools like computer software (e.g., McMahon, O'Neill & Cunningham, 1992), teaching and coaching techniques that can serve as scaffolds or Zones of Proximal Development for supporting ongoing processes of knowledge construction, and so forth. In other words, teaching becomes the creative craft of working within the teaching learning context with ideas, tools and techniques, not a process of following rules and prescriptions.

So the only prescription we have to offer is "Warning! Prescriptions can be hazardous to your pedagogy!"

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Resumen. Las prácticas típicas y educacionales como prescripciones se catalogan, repasan y critican. En contraste, la teoría semiótica y constructiva se adelanta como los aprendizantes vienen a entender el mundo. Al fin, la sola prescripción ofrecida es que el hacer de prescripciones puede ser arriesgado a la pedagogía.

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Toward a Mutual Interplay between Psychology and Semiotics

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Abstract. Questions are raised about commonalities, mutual offerings and possible influences between psychology and semiotics. They seem to share similar interests, yet their relationship appears less than optimal. Four different approaches to semiotics are briefly outlined. One is further identified, as the framework of Peircean semiotics, as focusing on sign processes or sign effects which are understood as a general type of causation particularly suitable for use in psychological problems. A dialogue between a psychologist and a semiotician is used as the basis for comparing and contrasting fundamental ideas of semiotics and psychology that might interplay with each other. Finally, this paper concludes with a brief discussion of a semiotic understanding of the concepts of "person" and "self".

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Introduction. Both semiotics and psychol-ogy are characterized by extreme pluralism. Both have a long past and a short history. Also, both disciplines claim central positions in the emerging scientific trends of the next century. Both have grown explosively in the recent past; psychology since World War II, semiotics mostly since the seventies. Yet both enjoy a mixed reputation in scientific and public opinion.

Are there deeper commonalities between psychology and semiotics? Can they offer something to each other? If so, how can the two fields mutually enrich and improve each other? These questions will be the focus of this paper. A short characterization of each field follows.

Psychology. It is impossible to say in a few lines what psychology is. So let me just briefly characterize how I for one prefer to understand the field. I see it as an ecological science, building upon vital and social instincts and studying people within social contexts. In fact, psychology cannot investigate isolated individuals, because such people cannot exist. Thus psychology is, in my understanding, the science of the relationship between humans and their environment, on the level of information exchange rather than matter-energy metabolism. It studies humans as a part of nature who, in historical, social, and personal processes, develop themselves as creators and creatures of their culture.

Semiotics. Since semiotics is less well known, I need to go into a bit more detail. There is also quite a bit of content-related specialization in semiotics. You can make out semioticians oriented towards linguistics, literature, the visual or auditory arts, philosophical, biological, or computational topics, public relations, fashion etc. etc. But those applied distinctions are less important here; so basic or formal distinctions only will concern us in this exposition.

Semiotics is often defined as the study of signs. This is similar to defining psychology as the science of behavior. In both cases, not much is said. Depending of what you mean by sign or by behavior, and depending on what aspects you emphasize in that study, you get quite different sub-disciplines which, by the way, need not be exclusive of each other. For an inclusive reference both in terms of topics and traditions of present-day semiotics and also including a large bibliography, I recommend Sebeok (1986).

Studying signs can focus; a) on signs as a special kind of object, b) on the meaning of signs, c) on the use of signs, and d) on the effects of signs.

a) Signs as Objects. Still quite common in semiotics of today are variants of the classical approach going back to Aristotle, Augustine, Locke, Leibniz and many others. Signs are seen as special objects which have a special meaning and which can, in some respect, represent or substitute other objects.

The classical approach can be characterized by the famous phrase *Aliquid pro aliquo*, or "something for standing for another thing". A sign or signifier stands for something signified. The distinction between *signifier* and *signified* drawn by the Swiss linguist Ferdinand de Saussure around 1900 has strengthened as well as expanded the traditional approach.

If you look at signs as objects, you can then "botanize" signs, classify them and investigate whether the coordination between sign objects and sign meaning obeys rules and, if so, what kinds of rules.

Beyond linguistic signs, such as phonemes, letters, words or sentences, all kinds of matter and energy configurations in general and their components in particular can be treated as signs. By way of example, we can look at such phenomena as gestures (from everyday behavior to artful dance), exchange objects (from souvenirs to money), buildings (from huts to cities), and many other cultural codes (from traffic signs to law).

It is as useful and desirable as it is problematic and sometimes deadly to explore all kinds of lists of signs, with pointers to their respective meanings. Used with care, such encyclopedias of meaning are indispensable aids. All of us, in fact, have partial versions of such "lists" in our heads. However, the problems of this approach should also be obvious. Naturally, everything has its meaning or meanings; it just depends. In fact, the "signs-as-objects" approach goes astray in its attempts to multiply distinctions and definitions: signs against non-signs, this sign class against that, this variant of meaning, and so on. Furthermore, any classification is in a sense arbitrary, and can therefore be replaced by any other arbitrary classification.

b) The Meaning of Signs. By looking at the discussion above, we can easily under-stand attempts at turning the object approach "upside down". Semiotics as the science of meaning is both a development of and a reaction to the centrality of the sign-object pairing. Variants of structuralism, to be seen as the principal movement of this approach, are based on the conception of distinctive features (inaugurated by Saussure and developed by Roman Jakobson, Jurij M. Lotman, Algirdas J. Greimas and others). The central tenet of this approach is a general notion of "text", referring to any phenomenon, including its elements and their relations, as if it were "composed". Structures of distinctions within texts, and beyond in contexts, constitute meaning and signs, and not vice versa.

It is easy to see that, especially in fields such as literature and the arts, an important motive for producing signs is innovation. Catalogues of signs with fixed meaning can then become as much of a nuisance as a support. If you want to express something that has not been "said" before, you might need to "blow up" existing sign classes and categories.

Examples are hard to clarify briefly. Think, perhaps, of a piece of music or architecture. Of course, you can list myriads of sign objects and suggest possible meanings for them. But it can be argued that you miss the "essentials" of the piece by following this procedure. Instead, the process of "going through" the whole of the "text" as a structured ensemble is assumed to generate its meaning. Therefore, this approach advocates the primacy of meaning.

c) The Use of Signs. The third approach is the most commonly accepted today. It is based on some theory of communication, more or less influenced by theories of information exchange in technical or social systems. Here, signs are not conceived as either material objects or as mental meaning, but rather in terms of their function in communicative processes. Signs are considered vehicles or carriers of meaning. Naturally they must have a material basis, but their essence is the mediation of information between two systems.

This approach, perhaps quite characteristic of the technical Zeitgeist of the second half of the 20th century, owes much of its impetus to Charles W. Morris, a psychologist-sociologist-philosopher of American pragmatist descent. It has been taken up worldwide. Depending on what one prefers to accept as a communicative paradigm, there are dozens if not hundreds of sign function models. Furthermore, I think I can presuppose some knowledge of this approach by a psychological audience, since psychologists are used to thinking about models of information transfer between some sender and receiver, whether the examples involved are part of mechanical or computer systems or are living systems such as brain parts or human speakers and listeners.

I think that this focus on sign processes realized in communicative models is a great advance for semiotics. Yet this by no means renders the "object" or "meaning" approaches obsolete. On the other hand, the distinction and definition problems prevalent in the "sign-object" approach are only deferred rather than solved. Arbitrariness of initial definitions continues to plagues the field. Instead of declaring this or that to be a sign, controversies and dogmatisms rage now over such questions as whether the concept of communication should include or exclude intentionality, whether or not a sender is obligatory, or whether communication presupposes a code or not.

d) Sign Effects. Difficulties of the kind associated with the other three approaches have led a number of semioticians to propose or rather reconsider a more general approach to sign processes which might best be described as the investigation of sign effects.

These efforts are quite deliberately grounded in pragmatic philosophy. This comes as no surprise, since the founder of pragmatic or action-oriented thinking, Charles S. Peirce, is certainly the most influential modern semiotician as well. In fact, most of the concepts used today in all of the approaches described above (e.g. the icon-index-symbol distinction) are based on Peirce's work. This fourth approach is hopefully his living heritage.

Signs in this conception (similar to their definition in the "meaning" approach), are entities that should not be defined a priori and then classified. It is also not sufficient to functionalize traditional sign concepts as in the communication approach. "Signs", whatever else they are, are "born from" signs and "procreate" other signs. A sign, for Peirce, is anything that has the potential to, in suitable circumstances, create other signs. Thus the focus of this approach is on the role of "signs" in the becoming of signs. Semiotics, then, is the study of that type of causation which is carried on by signs. Most of what I have to say in the following about the mutual benefits from an interplay between semiotics and psychology should be understood as illustrating this fourth approach.

The Interplay of Psychology and Semiotics.

Before I launch into my discussion proper, let me make a few general points. First of all, typologizing semiotic approaches into four categories can easily obscure issues that are important across all four categories. Let me further note that, in what follows and in general, I strive to avoid using the terms "sign" and "meaning" whenever I can, because they are irreducibly polyvalent. Of course, I need them for reporting the various semiotic traditions. Otherwise, my usages are intended to be both untechnical and commensensical.

What do Psychology and Semiotics have in common? From what has been said so far, it is evident that my thesis is that the two fields have much in common. Looking at the matter from a semiotician's perspective:

In spite of the abstract nature of the descriptions of the four approaches, it is obvious that semioticians investigate *sign processes* within the framework of systems for receiving, processing and producing signs or sign-type entities. In particular, those systems are living beings, and primarily humans. Note that these are roughly the same areas claimed by psychologists as their subject matter. Terminological discrepancies should not hide the essential identity.

Scientific psychology is unthinkable without perceptual and behavioral processes, either as a topic *per se* or as a methodological requirement. Semioticians would rightly contend them to be of a sign-type character.

For example, what the psychological researcher presents to his/her "subjects", whether conceived as so-called "stimuli" or as physical or social situations, are produced or selected by the experimenter as a kind of sign and are taken as such by the subjects. Furthermore, inferences or generalizations the researcher draws about real life situations imply that the experimental setting somehow represents the latter.

Similarly, what the researcher records and analyses in the form of reactions, behavioral acts or traces, have sign-type character. Whether or not the subject has insight into this state of affairs, and whether or not the researcher explicitly thematizes it, the subject cannot help but give signs to the researcher which the latter analyzes as signs, in that he/she infers from them something else. The researcher is less interested in the behavior as such, but rather in what it means in this or that respect.

Finally there are semioticians who claim sign-type characteristics for psychic processes as well. Looking at the matter from a psychologist's perspective:

It is true that many semioticians cultivate strong interests in psychological topics. Quite a number of papers and articles at semiotic conferences or in semiotic periodicals deal with issues that are typical in psychological publications. However, it is not easy for a psychologist to accept some of what is written in these semiotic contributions. Sometimes, psychological models or theories are selectively oversimplified. Also, some semioticians tend to shield themselves from psychological data that do not fit their semiotic expectations. This leads to the inevitable conclusion that semioticians could benefit greatly greatly from a broader and richer understanding of the tenets and findings of contemporary psychology. Also, it is imperative that semiotic models should be able to account for the variety of findings that the psychological community have uncovered about human behaviors and actions.

What can Psychology and Semiotics offer each other? Instead of listing here a considerable number of topics that would require extensive context, I propose to develop these ideas within the context of a dialogue between a semiotically interested psychologist (P) and a psychologically interested semiotician (S).

Common field, autonomous approaches: P: Could we make sure from the outset that we both consider our respective disciplines completely autonomous? Just like the earth is studied by many geo-sciences, we need several and varied approaches for looking at the being-and-becoming of people in their worlds.

S: Of course. This study of the relationships between living beings and other entities in their worlds requires a multifaceted set of descriptions and analytical tools.

Difference of approach: P: What do you see as the principal differences between the respective kinds of analyses of our two disciplines?

S: As Peirce (1902, see CP 1.242ff. and elsewhere) pointed out, we can differentiate two broad fields of empirical or object-oriented science, namely the psychical and the physical sciences. Psychology, along with such fields as sociology, anthropology, history or linguistics, comprise psychics at large and should certainly hold a central place within the group. In addition, psychology might take a special interest in the areas of overlap between the physical and the psychical sciences. It is quite unfortunate that in its history of roughly a century, psychology preferred to place itself on the physical side of the break between the physical and the psychical sciences, rather than trying to build bridges based on its "psychophysical" outlook.

On the other hand, semiotics should be seen primarily as a formal or normative science, in the same category with aesthetics, ethics and logic. Actually, for Peirce, semiotics is a part of logic, or more accurately its most inclusive form. In the same way that phenomena investigated by the psychic sciences also include physical characteristics, you might call semiotics the "logic" of psychical entities.

Formal vs. prescriptive: P: What do you mean by a formal science? That it prescribes, like logic, how propositions and judgments or other sign complexes are to be formed in order to be true or valid?

S. Watch out! That would be a fundamental misunderstanding of semiotics. Semiotics is a strictly formal discipline, yet it is built upon the observation of the mind in action. As opposed to the empirical sciences with their respective particular points of view, it observes on the most abstract level possible. It claims to eschew particular points of view of observation, and, instead, supplies those general forms of presentation that pertain to everything.

Being evaluative or normative does not include prescription, but rather points out consequences in the pragmaticist sense. Pragmaticism, for Peirce, is a method for attaining an apprehension of ideas from the consideration of the practical bearings they might possibly have (1878, CP 5.402). People are then free to take those consequences for whatever prescriptions they choose to make themselves.

Epistemological priorities: P: What you say is not easy to understand. Furthermore, you seem to contradict yourself. Having described semiotics as the logic of psychical entities, you now claim that it operates at the highest abstraction level possible. Isn't that getting things backwards? Aren't psychical phenomena special cases of physical phenomena?

S: Our cultures believes your last claim precisely because we have become used to that belief. But where does that certainty come from? It cannot be more than just a presumption or a prejudice on our part. As long as we hold onto the assumption of the priority of physical things over psychical things, you must admit that our ideas of the physical are epistemologically subsumed by something "psychical", however else you might like to speculate about the matter ontologically.

A chance to neutralize Cartesianism: P: I see; you dismiss Cartesianism. You might be right. Psychology, though, being based on the very idea of dualism, seems to hold onto Cartesianism strongly. And with dualism seeming to have been eliminated as a serious position, psychology's clinging to materialistic reductionism becomes more and more obstinate. But do you then feel that those eternal categories of thought ascribed to Cartesian and Kantian subjects --such as substance, causation, necessity-- to be fictions?

S: They are certainly important as special forms of presentation, but not as the universal "truths" they have been claimed to be. I think we should make a serious effort to confine them to where they belong, namely within the nice little closed systems that spawned them. It is true that we encounter psychical and physical phenomena as part of our intuitive experiencing of the world; but that does not imply that our constructs to understand the world must be psychical and physical. We should not be so concerned with how things act upon us, but rather find out, with the means available to us, how they act upon each other.

Since the dialogue is becoming a bit philosophical here, and thereby losing itself in its own jargon, we now halt this train of thought for a more practical turn on the concerns of the two sciences.

Semiotic vs. physical conceptions of causation: S: I feel that we also agree, each from our own point of view, that we are not at all happy with the classical conception of causation; namely the necessary and sufficient coordination of effects to causes. You are in need of a more general conception that concedes effects but leaves something open for unpredictable developments in life courses, evolution, and cultural change. It cannot be just a matter of not yet knowing all the effective causes. Furthermore, as everybody knows from personal experience, the so-called final causes never seem to produce what has been predicted.

P: If we have given up our former beliefs in universal one-to-one cause-effect-connections, or confine them to special conditions in the physical sciences, it is indeed strange that so many psychologists still operate on the basis of deterministic assumptions and try to reduce "erratic" psychical phenomena to "certain" physical phenomena. On the other hand, I am just as embarrassed by constructivist proposals which supplant causal patterns and effects in concrete reality with effects in the minds of observers.

Taking seriously the reality of interpretation: S: So you are trying to pursue a conception of causation which considers the fact of interpretation in the world itself? In other words, you are after a conception of "conditioning", in the most general sense, which sees entities, such as living systems, not simply and merely as results of adaptation to some independently given reality. You feel that organisms, social systems, persons, and cultures can be understood as phenomena that are constituted neither simply by chance nor as the result of simple preprogramming. You feel that they are capable, to some extent, of "making history".

P: Since you maintain that semiotics in the wake of Peirce is able to provide the conceptual means for this task, I would like to know exactly how this can be done.

S: Semiotics provides a general form of thought or presentation which avoids dualism and does not play the game of ontological priority of either the physical or the psychical. Epistemologically it accepts the primacy of the mind. However, it approaches the mind empirically, not by postulating any *a priori* conditions. This form of thought or presentation is triadic in nature. Sign-types do not represent a thing, but rather present the relations between entities that allow for the forming of further relations.

At this point, we break off the dialogue. A formal model of the semiotic process is beyond the scope of this paper, and can be found in several of the references listed in this paper. Instead, let us look at one crucial issue that psychology and semiotics share; the nature of the "person" or "self".

Examining Semiotic Models of "Person" and "Self": It is a strange matter of course in Western psychological thinking that we presuppose the existence of persons, and only of individual persons, as "selves" in the Cartesian sense. True, developmental psychologists study their change in ontogenesis. But their initial constitution is taken as a given. Only metaphorically, it seems, is the notion of "self" lent to animals or to groups of people. The question of their origin of self is also completely unexamined. The related issue of the beginning and ending of individual lives is barely treated, and then only in operational terms.

Peirce and a few of his modern interpreters (e.g. Singer 1984, Colapietro 1989) have outlined a semiotic conception of what we call the "self" that does not take it apart from the functioning of the person. If we construe the person as a semiotic structure that is in the process of becoming, then we can dispose of the Cartesian framework in our effort to understand its origin .

"A person is, in truth, like a cluster of stars, which appears to be one star when viewed with the naked eye, but which scanned with the telescope of scientific psychology is found on the one hand, to be multiple within itself, and on the other hand to have no absolute demarcation from a neighboring condensation." (Peirce 1893, Ms. 403)

Conclusion: I have touched upon a couple of topics from a very complex set of ideas and in addition I have dared to, I hope constructively, criticize some of our current views. I hope that I have made plausible that it would be as mindless for psychology and semiotics to live ignorantly apart as it would be for each to to give up its own respective identity. Yet, to join forces in a mutual interplay might bring growth and benefits to both fields. Psychology can acquire a means for dealing with culture, while semiotics can gain by observing the effects of signs in their most productive psychological provinces. Yet only time will demonstrate whether or not some mutual engagement between members of the two disciplines will bear fruit.

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Resumen. Cuestiones se levantan sobre las comunidades, ofrendas mutuas, e influencias posibles entre la psicología y semiótica. Se parece que ellos comparan unos intereses semejantes, a pesar de todo la relación parece menos que óptima. Cuatro acercamientos diferentes a semiótica se trazan brevemente. Se identifica uno, el marco de semiótica de Peirce, como enfocando en procesos o efectos indiciales cuales se entienden como un tipo de causación conveniente con problemas psicológicas. Un diálogo entre un psicólogo y un semiótico se usa como una base por el comparar ideas fondamentales en psicología y semiótica en interacción una a otra. Al fin este papel concluye con una discutión semiótica del entender de los conceptos de "persona" y "yo".

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Semiotics and the Deconstruction of Conceptual Learning

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Abstract. Modernism believes in objective knowledge as reality beyond human perception, while postmodernism argues that reality is a cultural concept using the three tools of deconstruction, phenomonology and semiotics. Deconstruction attempts to show how "real objects" are synthesized as concepts useful and acceptable to members of a given culture. Additionally phenomenology criticizes science for taking a very restrictive view of life. Semiotics as a generalization of linguistics analyzes how we culturally give sense and meaning to our world and its objects.

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What is *postmodernism* and why is it saying all these terrible things? Postmodernism is a loose alliance of intellectual perspectives which collectively pose a challenging critique of the most basic assumptions of the modern educational enterprise. What are these perspectives? What do they have to say that can open new doors for educational research and practice? I would first like to sketch a personal view of postmodernist discourse, and then focus on its challenges to the foundations of most modern views of abstract conceptual learning. Going beyond critique, I would like to sketch some alternative, postmodern possibilities.

Modernism, like any intellectual movement, will ultimately be defined from the viewpoint of its successors. Postmodernism is beginning this process by offering a critique, a reaction against some intellectual trends that perhaps began as early as the Renaissance, but certainly became well established by the later l9th and early 20th centuries. This is the foundational period for the discipline of psychology and for educational theory and most of the social sciences, as well as for modern literary and fine arts criticism. Postmodernism is primarily, in its origins, a philosophical critique of the assumptions built into these disciplines in their formative years. The critique is gradually being extended today into the natural sciences, the inner fortress of modernist assumptions about knowledge and reality.

From the postmodern point-of-view, modernism is defined by its belief in objective knowledge, or at least in the possibility of objective knowledge, and by its assumption that such knowledge refers directly to an objective reality which would appear in the same way to any observer. A further characteristic modernist assumption is that knowledge is a product of the activity of the individual mind, fashioning its ideas or mental schemes to correspond with this objective reality.

Postmodernism, on the other hand, argues that what we call knowledge is a special kind of story, a text or discourse that puts together words and images in ways that seem pleasing or useful to a particular culture, or even just to some relatively powerful members of that culture. It denies that we can have objective knowledge, because what we call knowledge has to be made with the linguistic and other meaning making resources of a particular culture, and different cultures can see the world in very different ways, all of which "work" in their own terms. It argues that the belief that one particular culture's view of the world is also universally "true" was a politically convenient assumption for Europe's imperial ambitions of the past, but has no firm intellectual basis.

Many postmodernists go further and point out that just as Europeans temporarily imposed their view on other cultures by force, so within European cultures, the upper social classes, and particularly middle-aged, masculinized males have dominated the natural and social sciences (as well as politics and business), and so this would-be universal world view is even more narrowly just the viewpoint of one dominant social caste or subculture.

Postmodernism traces its roots to the movements of *Structuralism* and its counter-reaction, *poststructuralism,* mainly in the the French speaking intellectual community of the 1960s and 1970s. Structuralism is either the last stage of modernism or the immediate precursor of postmodernism. The great spokesman for structuralism in this period was the anthropologist Claude Levi-Straus (e.g. 1963), who argued that the patterns of human culture, from village architecture to premodern myths, had the subtle regularities of mathematical structures (not quantitative ones, but combinatorial and symmetry patterns as in algebraic group theory). He was joined in this by Jean Piaget, who saw in the developmental movement of children toward modern concepts of space, time, matter, and quantity a construction by the child's mind of just these same sorts of regularities in the operations it performed to make sense of the world (e.g. 1970, 1971).

The structuralists were often inspired by the successes of modern linguistics, first in using meaning to analyze the seemingly mathematical regularities of the sound systems of language (e.g. Jakobson 1956, 1962), and later in Chomsky's (1957, 1965) use of transformations (the heart of quasi-mathematical structuralism) to illuminate regularities in syntactic rules. Language, culture, and thought were all to be brought at last into the modern fold of mathematically regular sciences.

By codifying the enterprise of modernism, the structuralists made it a more precise target for its critics. The critique can trace its roots, a bit mythologically, back into the Enlightenment (e.g. Giambattista Vico 1774/1968), and with some justification as far back as Friedrich Nietzsche (e.g. 1967, 1989). Those who have been posthumously enrolled in the pedigree of postmodernism include the philosophical phenomenologists (e.g. Edmund Husserl, Maurice Merleau-Ponty, Jose Ortega y Gassett) and the great apostate of modernism, Ludwig Wittgenstein (1949/ 1958). But the most influential, and first truly post-modern critiques were those by Michel Foucault (esp. 1969s72) and Jacques Derrida (esp. 1967/1976).

The common denominator in all these critiques (except perhaps for those of the phenomenologists, who were recruited rather late) is the analysis of *discourse.* It is the focus on discourse, and language, that unites structuralists and post-structuralists, but while the structuralists sought the regularities of language, the post structuralists pointed out how language in use, the discourses of philosophers and poets (and, yes, of psychologists and physicists, too), refuse to be contained within the patterns of order we try to impose on them. To the extent that our discourses are our tools, if our tools are -- the modernist would say, in horror, unreliable; the post modernist, in exaltation, self-organizing -- then the scientific ideals of the structuralists, and of modernism generally, are a chimera, an immature self-delusion we have to grow out of.

Foucault said, in effect, that it was chimerical to imagine that historians could reconstruct a real past; historical discourse is a discourse of the present, serving present ends, making sense for us today out of the archeological traces of past human activity.

Foucault undertook to write histories of discourses, including in that term not just language, but all the things people do to make sense of their worlds. He showed, to many people's pleasure, that the very objects of modernist scientific investigation, the very notions of self, nation, language, mind, sex, crime, normality were themselves specific historical constructions, the *products,* not the objects of human discourse and inquiry. He refocussed attention from the so called 'phenomena' science sought to investigate, to how science (read philosophy, psychology, law, common culture) produced meaningful phenomena through its discoures.

The essential step away from modernism was the new focus on *meaning.* How does a text mean? How does a graph or diagram tell us something? How do marks on paper (or lighted pixels on a screen) convey to us a complex conceptual meaning? A landscape is a text for a geologist. An apparatus and its readout is a text in the same sense for a physicist. The principles, and the problems of meaning, are the same. If the meaning of any text depends on how we interpret it in relation to other texts, how can either data or explanation be fixed and stable in its own meaning, much less the basis for objective knowledge of an objective world? Why should we believe that scientific texts are not subject to the same principles of interpretation as literary texts? Why should we believe that primary data can be read from the book of nature without the same problems, or arbitrary conventions, of inter pretation that beset the reading of any other sort of "book"? Why should we believe that the practical effects of technologies are legitimate warrant for the objective truth of theories, when the only links between them are yet more texts, more discourses?

Derrida was more playful in his critique, and more direct. Foucault the historian had shown, again and again, exactly how the disciplines created their objects through discourse, and created them very differently in different historical periods. Derrida was a philosopher and sought, in his disruptive readings of classic texts, to show how imperfectly any discourse makes its objects and the world they are supposed to inhabit. Whether a literary, philosophical, or scientific text, Derrida "deconstructed" their constructions of "real objects" of study or narration. He took hold of the key structuralist notion of transformation (A -> B), and showed how unstable any discursive construction of "difference" (A - B) must be. With a rather Zen-like sensibility, he focused on the absences (B is not A) that all presences presuppose, and on the gaps that must be made to separate things we wish to construe as different. He attacked not just positivism (the naive epistemology of turn-of-the-century science, and still of most contemporary curricula), but "positivities", the notion that things are to be defined by what they are, when in fact discourse can only define something as what it is not. (All categories are based on sets of contrasting alternatives; to be of type Y means *not* being X or Z.)

Derrida is not widely popular among English speaking academics -- partly, I think, because they have no patience with the essentially literary genres in which French speaking intellectuals write philosophy. His *deconstructionism,* primarily a movement in literary criticism and similar disciplines, is very threatening when applied to the social sciences. It undercuts the possibility of their being positive sciences at all, of their pretensions to "objective knowledge" about the social world. But then deconstruction raises the same epistemological problems for the traditional sciences as well, without negating the usefulness of their technologies. (Once the link between theory and practice is weakened, theory cannot turn to practice for its "proof", but then by the same token practice can go on its merry way whether the metaphysical claims of theory are justified or not.)

There are two other major currents in Postmodernism: phenomenology and semiotics. Phenomenology (for major figures, see above) basically chides the scientific view of human life with being too narrow, too mechanical, too little focused on how people live and make their lives meaningful, too obsessed instead with the artificial objects made by their discourses: kinship systems, cognitive schemata, class struggles. Feminism has found phenomenological perspectives congenial for efforts to construct new discourses of the world rooted in women's experience; intellectual feminists are attracted to postmodernism because it makes it much easier to see how what men define as "the world", "the problems", "the discipline", are just that, what some men's discourses have defined them to be. (See for example Harding 1986, Haraway 1991, Nicholson 1990.)

The phenomenological perspective does not need to be limited to conceptualizing how the world looks different to men and women; it can be used to examine how it looks different to the young and the middle-aged, to the novice and the expert, the student and the teacher, the ghetto child and the comfortable academic. We each construct our own life worlds, and even when we are in the same room, trying to talk to one another, we may still be worlds apart.

Semiotics, the last of the major currents within postmodernism that I will mention, is a generalization of linguistics. At its narrowest, it is merely a codification of the symbols offered us by our culture, and the formal description of how those symbols are usually combined, be they words, gestures, graphics, foods or clothes. At its most general and most powerful, it is the analysis of how we deploy our cultural resources for making sense of the world: language, depiction, action. It is the systematic uptake of Foucault's challenge: to see how we make our meaning-reality with the symbolic tools available, and how our doing so leads to changes in those tools, our use of them, and the sense we make with them. Because semiotics is the branch of postmodernism I know best, and the branch that offers, I believe, the most highly developed alternative tools for educational research and practice, I want to describe it a little more, and turn its light on the problem of abstract conceptual learning.

Social Semiotics and the Construction of Meaning. Linguistics is important because language is, *par excellence,* the tool most of us use to make sense of nearly everything nearly all the time. Language is a resource for making meaning. Studying how people use language (i.e. our *discourse,* in the narrow, linguistic sense) to make the meanings of physics, or economics, or cognitive psychology, in research, in teaching, in writing, in dialogue with colleagues and students, can reveal how these disciplines construe general and special human experience into the categories and relations that characterize their unique disciplinary perspectives (some examples: McCloskey 1985; Bazerman 1988; Lemke 1988a, 1990a, 1990b; Halliday 1988; Halliday & Martin 1993). This is linguistics focused not on form, but on function (e.g. Halliday 1985). It has more in common with the tradition of grammar and rhetoric than with modern formal syntax (though there is a gradual convergence). Linguistic discourse analysis is an applied semantics, a textual semantics, with formal syntax functioning as the legs that carry the dog, but not the tail that wags it.

Some studies of discourse(s) look more closely at the grammar-semantics connection (Halliday 1988, Halliday & Martin 1993); others look more at the semantics-rhetoric connection (Lemke 1988a, 1990a, 1990b), or at the rhetoric-genre connection (McCloskey 1985; Bazerman 1988). If I write a science textbook, my editors and readers expect me to follow certain conventions of format and organization: certain sorts of information are to be included, laid out in a certain way. These are the conventions of the textbook *genre*. In the course of a chapter I may want to persuade my readers to accept an argument, or I may want to raise some critical questions. These are functions of my *rhetoric* at that particular point, what I am trying to do for (or to) the reader. If I am going to be persuasive I need to follow the conventions of logic and argumentation that my community of readers probably accept and are used to. As I write my argument, I have to express particular meanings about something. I have to choose my topic and what I want to say about it specifically. These are matters of the *semantics* of my text. They influence my choice of words and of conceptual relationships that I wish to express. In order to do so, in writing a particular clause of a particular sentence, I also need to bear in mind the rules of English grammar and its syntax.

Studies of discourse are inevitably embedded in studies of social and cultural conventions; they require a social linguistics more than a cognitive linguistics (though both may have their uses). It is not possible to adequately analyze how individuals make sense if you do not know what the typical discourse patterns, the typical sense-making practices, of their community are (their semantic, rhetorical, and genre conventions at least; see for example Lemke 1989). It is particularly obvious that you cannot do so when you see that all discourse analysis is founded, explicitly, or implicitly, on the principle of *general intertextuality* (Lemke 1985): all meaning is made against the background of other meanings already made and shared in a community.

When I write a textbook chapter, or read one like it, I make sense of it by comparing it, consciously or unconsciously, with other similar texts I have read before. I recognize that it is a textbook and not a research treatise by its genre conventions, so I expect some things from it and not others. I make sense of its content largely because I can fill in its unstated assumptions from other works I have read on the same topic. I make sense of its patterns of argumentation because they are familiar to me from elsewhere. I interpret its use of technical vocabulary based on the specialized meanings I know these words have in this specialty field. And so on.

The totemic grandfather of social linguistics and intertextual discourse analysis of this sort is Mikhail Bakhtin (1929, 1981, 1986), a figure who ranks today with Foucault (and perhaps outranks Derrida). Like

Foucault, Bakhtin takes a larger view of discourse than simply language in its narrowest sense. Discourse is a mode of action, almost synonymous with meaning-making itself. The units of discoure for both of them are units of meaning, or units of human activity that make meaning (utterances), and not linguistic units per se (clauses, sentences). Their perspective is *semiotics*. Semiosis is the process of making meaning by deploying the resources of social systems of signs in a community. While linguistic signs (words, clauses, texts) form such a semiotic resource system, so do many nonlinguistic, or only partly linguistic modes of human action. We can make meaning with dance, gesture, and movement; with pictures, diagrams, and typefaces; with songs, meals, and clothes. Most fundamentally, we make meaning with action. Linguistics made the first breakthroughs in the study of *how* we make meaning by deploying semiotic resources, but the general processes, it appears, apply to all meaning-making activity.

In the sciences, we do not just talk and write. We also act in many other ways that contribute to the special meaning constructions of our disciplines (e.g. Latour 1979, 1987) whether in the laboratory, in the field, in data collection and analysis, or in the economic, social, and political dimensions of the subcultures of our disciplinary institutions. All these actions function in the same way discourses do, to make possible the meanings of the discipline, to construct the objects we say we study. To say that objects or phenomena are social, discursive, actional, semiotic constructions is not to deny their materiality. It is to emphasize that what our theories, our discourses take hold of, are objects or phenomena as meanings, i.e. as we conceive of them, speak of them, measure them. This is not so far from the scientific doctrine of operationalism, that every physical object or quantity is defined by our procedures for observing or measuring it. Semiotics tries to tell us as much as possible about how it is possible to construct such meaning-objects.

I can read a book or I can weigh it on a scale. I can treat it as a symbol to be interpreted semiotically or as a material object to interact with physically. Semiotics is a discourse that tells me how the book's writing and diagrams and language mean something. Physics is a discourse that tells me how books and springs and scale-pointers interact physically, and which enables me to read the scale and interpret it as having a meaning about the weight of the book in the context of a discourse about mass, weight, gravity, force, elasticity, etc.

Every symbol must also be a material object, and any material object is recognizable and interpretable only in relation to some system of semiotic categories. Every act of interpretation of a symbol is also a physical, physiological process as well as being a semiotic practice, an enactment of a cultural system of conventions for making meaning. The material and semiotic aspects of things and processes are complementary to one another. They describe two different systems of relationships that we can construct among objects and processes. One of these is the familiar system of material, physical, chemical, thermodynamic, ecological relations: webs of material interaction. The other is the semiotic system of relationships of meaning: similarity, difference, categorization, ordering, association, etc.

The most basic semiotic relationships are very abstract, but for many purposes one can think of them in terms of a few simple types. Paradigmatic relations are those that tell us what something might have been but isn't: a physics textbook is not a biology textbook, a textbook is not a novel, a book is not a magazine, etc. Paradigmatic relations define contrasting alternatives, meaningful differences within similarity. Syntagmatic relations tell us what parts make up some whole:

words that form a single sentence, sentences that form a single paragraph, different volumes that make up a single encyclopedia. Intertextual, or indexical, relations tell us in a broader sense what goes with what: this book is relevant to interpreting that book, this situation or event is a relevant context for that one, etc. The most fundamental principle of semiotics is that meaning is possible only because not all possible combinations of things, events, contexts, are equally likely. The particular odds on various combinations describe the culture of our community: our expectations and our patterns of behavior, including how we interpret meanings and how we interact with our environment.

A postmodern semiotic constructivism such as I have just described (for a fuller account, see Lemke *in press) is* itself, of course, just another discourse. You can get used to it, use it, enjoy it. Or find another that works better for your purposes. Postmodernism reclaims for science, and philosophy, the intellectual freedom of art. It refuses the power moves of some discourse factions that insist that their discourses are the only possible ones because they are "true". Many different discourses "work". It is not even possible to say absolutely whether many of these discourses are "consistent" with each other or "incompatible". They can be construed as being either, and usually are.

Most people reared in modern positivist traditions, or their commonsense variants, find themselves viscerally upset by the idea of rejecting notions like objective truth and reality. For a long time we have been sold the belief that these notions are indispensable, not only for science, but for morality. Postmodernist sensibility regards these reactions as understandable, but a little childish. Many postmodernists are arrogant; high levels of self-confidence are necessary when disagreeing with the foundations of a large part of your own culture. But postmodernism, semiotics, or social constructivist epistemology, do not require total faith, or even complete self-consistency (another chimera, read Godel 1962). You can continue to believe that there is an objective external reality out there somewhere, and that truth is the common quality of propositions that correctly describe it, so long as you do not use these assumptions to try to gain power over your opponents in intellectual debate. Many postmodernists believe that such assumptions actually have no other practical function. Agnostics are heartily welcome in this un-church.

The postmodern, semiotic, constructivist view talks about meaning, not about truth. It talks about how discourses define phenomena, not about how phenomena are described by discourses. It always wants to know what people do that makes sense of what we ordinarily call an object or phenomenon. It situates meaning-making practices and the systems of semiotic resources deployed in those practices in the domain of the social, the cultural. Indeed, it sees social and cultural systems exactly as systems of such practices, systems of doings, and not systems of doers *per se*. The doer, the notion of a human individual, is as much a meaning-construction as anything else. If it is doings, i.e. social and cultural practices, that are fundamental, then as activities these practices consist of processes and participants defined in relation to the processes. Among the types of participant constructed in our culture are ones we call human individuals, but what a human is (an organism, a social individual, an actor or agent) is not necessarily the same from one type of activity to another. We learn how to conflate them, to make them all seem the same, and indeed how to think of ourselves as being constructions of this kind (cf. Lemke 1988b, in press). Human individuals cannot be taken for granted as the starting point of either social or cognitive theories.

As an example of this consider the question of whether and in exactly what sense a student is the same person in class and out of school, in math class and in English class, in small-group work and in whole class instruction. Of course our culture provides ways to unify these differently behaving individuals, but it takes work to do so, semiotic work. We miss an important perspective on the student if we carry this presumption of unity and consistency too far. If we assume that the student has the same characteristics, the same ability, the same intelligence, even the same personality or interests, in all these different settings and situations, we may be overdoing it. And if we assign a grade to a student, instead of to an event or a performance, what does it really mean, if the student wasn't the same person in each different situation on which we are basing the single grade?

Semiotic perspectives on learning and abstraction. The dominant theory of learning that guides educational practice in our society says that what people need to learn are "abstract concepts," which they can then apply to a wide variety of specific situations. Nearly everyone is convinced that conceptual learning is the most powerful form of learning, and the only problem is how to get more people to be able to successfully learn abstract concepts. The criterion for having learned an abstract concept is being able to apply it in new, unfamiliar situations. The way to teach abstract concepts is to demonstrate how they apply to several different situations until the student "catches on" or generalizes and "gets" the concept at an abstract level. The student will then be able to use the concept wherever it is relevant. -- Do you believe this fairy tale?

What happens in practice? A very, very small percentage of students seem to be "able" to learn abstract concepts in the sense described. If we accept fairly weak criteria of conceptual mastery, say the ability to apply the concept in situations not too different from the ones in which it was taught, but are rigorous about mastery at this level, a reasonable estimator of success across the student population would be the numbers of students who get top grades in courses like algebra or physics. Even most of these students, however, or their counterparts in other disciplines, would not meet the standard of being able to apply the concept 'wherever it is relevant'.

Applying the older theory, we could say that either there is something wrong with the students, or something wrong with the teaching (or testing) methods. But the evidence against this prescription for abstract conceptual learning for most students is so overwhelming that surely we ought to consider that there might be something fundamentally wrong with the theory? The closest that traditional educational psychology comes to this is the great "transfer of training" debate. The only conclusion I have been able to draw from all the data on both sides of this is that, in general, the more abstract the concept, and the more unfamiliar the application context or content, the less evidence there is for generalization.

A now long and distinguished tradition of dissenters (e.g. from Cole et al. 1971, Cole & Scribner 1974, to Lave 1988) have argued that higher reasoning processes are context- and content-sensitive, not context- and content-independent. People in this tradition have even wondered whether cognitive processes can be usefully described at all apart from specific social and cultural activities, or at least apart from relatively specific social and cultural strategies for action.

The strongest evidence for conceptual generalization seems to come either from low-level processes (e.g. perceptual shape recognition), where evolution may well have lent a helping hand, or from our persistent introspection which tells (a very, very few) of us that this is what we do in higher-level reasoning. But our introspection is tainted by the theory itself: we have ourselves internalized a common discourse of our academic, intellectual culture which shapes the meanings we give to our subjective experience. Perhaps neither we nor anybody else does any such thing as generalize an abstract concept. Perhaps there is no such thing as an abstract concept.

Put that way, we recognize that "abstract concepts" are not the sort of thing to which our culture assigns much of a "reality" status anyway. Do abstract concepts exist? We would probably say that, no, perhaps the phenomena they refer to, or describe, do, but the concepts themselves are just a shorthand way of talking about rather complex cognitive processes. The postmodern semiotician, of course, will see the very notion of "abstract concepts" as born of the discourse of cognitive psychology (and its predecessors), and regard what goes under that name as just a set of conventions for using particular linguistic forms (often in conjunction with nonlinguistic actions of various sorts). Some of us (myself included) question the usefulness of even the notion of cognitive conceptual processes as such, wondering what, at least in the present discussion, cognitive theories can say about human reasoning that linguistic discourse analysis does not describe more precisely and with greater economy of theoretical means (especially remembering that the data of this area of cognitive psychology are, by and large, contextualized verbal reports in the first place; see Thibault 1986; Lemke 1989, I990a; and even Geertz 1983).

In education we often proceed to teach something by first 'breaking it down into simple parts or steps' then teaching the steps and expecting students to be able to perform the whole. In the teaching of skills (famously, bicycle riding), it is well known that this is not effective, but in the teaching of most academic intellectual skills it is still routinely adhered to. Constructivism points out that this sort of reductive analysis into parts is only possible as a *post-hoc* activity. It is only *after* we have mastered the whole that we can understand how it can be artificially divided into parts. The parts are not 'natural', they are not *there* as a given prior reality. The parts are *constructed* by local conventions that depend on a prior facility with the whole. You cannot learn wholes through their parts. And the reason is that they don't *have* these parts! What you can do is learn how wholes are conventionally analyzed into parts, learning what precise kinds of part-whole relationships need to be constructed.

In academic education we also assume that students can learn abstract principles by induction from examples and by descriptions of abstract properties and relations. But just as skills do not necessarily have specific "parts" apart from how we choose to analyze them into these parts, so also an abstract principle is not necessarily visible in its "examples" until we learn how these examples are conventionally construed as instances of the same general principle. It is not necessarily true that the principle is "there" in the examples to be seen by anyone. Many students don't see these imaginary properties of examples even when teachers try their best to point them out.

In a classroom episode I analyzed a few years ago (Lemke 1990: 144-148), students could not "see" a wave moving on a long coiled spring in the way the teacher did, despite the teacher repeatedly demonstrating it right in front of them. They had to learn to "see" it in a new way, mediated by special technical distinctions named by specific terminology. They had to learn to use language, in conjunction with vision and motor action, to reinterpret experience in a new way, to "see" something that for the teacher was simply "there" in front of them.

For the purposes of learning and social behavior, we do not simply "see" photons registering on our retinas; we "see" meaningful patterns created by the higher centers of our brains according to the habits and conventions of our culture. The way in which these patterns are constructed is still somewhat mysterious in neurological terms (see Edelman 1992), but the social evidence for the process clearly shows the role of language and other systems of symbols. Learning to use a semantic distinction, such as that between "longitudinal" and "transverse" wave, or that between "motion of the medium" and "motion of the disturbances" as part of language is an integral part of learning to make and use the conceptual distinction.

We expect students to 'catch on', to formulate abstract generalizations that will then apply to new and unfamiliar examples. We expect that they will 'transfer' the abstract principle to new settings. But why? Mainly because our own cultural traditions, from Platonism to positivism, assume that the situations in which the principle applies really *are* " the same" in some respect that we can learn to *recognize*.

But for the postmodern constructivist there *are* no inherent similarities except the ones that a culture, a community *constructs* as meaningful, as significant against the background of an infinite number of possible categorizations, and constructs always, again, *post hoc,* i.e. *after* each instance is encountered. What our semiotic practices, such as the use of semantic distinctions coded in language, do is to enable us to fit instances into prior categories, or to create categories to encompass known sets of instances. We must *invent* a way to fit each new *type* of instance into an existing category, and insofar as the category is defined by the practices that assign its members, we actually change the category (i.e. add new categorization practices) for each new type of member.

This can only be done *post hoc.* Only instances that we already know how to type as members of a category will accommodate 'transfer'; genuinely non-trivial new instances cannot be automatically typed *because* they do not already *have* the categorically critical features -- those features must be *constructed* for them. They do not automatically 'fit' the category; they must *be fitted* into it. That requires work, social work. It cannot be done by an individual, because it must be done by the conventions of a community. It is ultimately as much or more a social than a 'cognitive' process.

As an example, consider one of the most widely generalized concepts of natural science, "energy". The history of science shows clearly that each new 'form' of energy (sound, heat, light, etc.) had to be defined in just such a way that it could be assimilated to the existing concept of energy. In fact, as each new form of energy was added, the concept itself, insofar as its meaning can be described as the sum total of all its possible uses or operational definitions, changed. The concept also changed insofar as it is defined by the set of operations for applying it to various phenomena.

No one can be expected to 'generalize' from a notion of kinetic energy to the concept of potential energy, or to be able to anticipate the proper definitions of various forms of nuclear energy from a knowledge of heat energy or electromagnetic energy. What do all the forms of 'energy' have in common? Not even how they are measured, not even their 'operational definitions'. You have to learn to call them all "energies" and learn that what this means is that, properly defined or measured, they can all play the same role in particular calculations or arguments, all fill the same slot in particular theoretical discussions. Our community has developed conventions for fitting each variation on the theme of energy into a common semiotic pattern (i.e. a general set of statements, whether linguistic, mathematical or graphical). That development has been the work of centuries. It can be recapitulated, but it would be foolish to imagine that it can be anticipated by individuals because it is somehow 'there' in nature to be seen. In fact, you have to be carefully taught how to look to see 'it' (i.e. to construct it) or how to 'show' it to (construct it for) others, or even how to argue that others should accept what you show as evidence for what you claim.

The implications for education of this reconceptualization of what abstract concepts are is radical and profound. In this model generalizations are culture-specific: of all the possible similarities of two events, two moving springs, two "systems with energy", our culture has historically opted to pay attention to just certain ones, which it has evolved methods (semiotic methods: linguistic, experimental, graphical, mathematical) for constructing. Even if you believe that the similarities are "there" in the sense that it just wouldn't work for practical purposes" (whose purposes? how practical?) to construct ANY old similarity, there are still an awful lot of possible similarities that CAN be constructed between two events or two systems in nature.

Learning our culture means learning which ones we do construct, how we construct them, and what good they are for our practical purposes.

But if these particular similarities are not "obvious" ones, if we have to learn how to "see" (i.e. construct) them, then the process of learning "an abstract principle" or "an abstract concept" or generalization is really the process of learning how to construct specific sorts of similarity among specific classes of instances. In terms of classical logic this means that categories are learned "extensionally", by learning what their members are and why they are members, rather than "intentionally" by learning a set of features which are common to all members of the set. Those "same" features have to be constructed DIFFERENTLY for different members of the set. We probably do this by stages or degrees, first learning how to "see" some sorts of phenomena as "waves", then how to see other sorts as being similar, then how to see still other sorts, etc.

When we come to a new and unfamiliar class of phenomena, we can propose that these too are waves, but it is ultimately a matter of social consensus whether our proposal is adopted or not (for whatever reasons). If history has already made this decision for us, and the criteria of the culture for validating that decision leave no leeway for reconsideration, there is really no way to expect us, the students, to second-guess this history. We just have to be told. We have to be let in on one more set of specific procedures for how to make *this* new class of examples look like the others, how to construct similarities between it and other classes of examples.

Perhaps those of us, a small minority, who are positioned within our culture in such a way as to have acquired habits for guessing (or reasoning) that are most similar to those of the people who made these determinations historically (i.e. upper-middle class, masculinized middle-aged Northern European males), we are more likely to guess "right", i.e. to decide as our forbears did. This does not make us more intelligent or more able at abstract thinking. It only signals that we have been cut from the same cloth. (Such habits are largely unconscious, and the product of experiences in all aspects of our lives, not just school experiences. For a theory of them as embodied dispositions, see Bourdieu 1990; for gender and class differences in how children and students make meanings with language in interactions with mothers and with teachers see Hasan 1986, 1990, 1992 on semantic orientations.)

Another important implication of this reconsideration of the nature of abstract conceptual learning is that the value of studying something "similar" to our ultimate object of interest is called seriously into question. In academic learning we have acquired the habit of teaching by simulations and simulacra, rather than by giving our students first-hand experience of "the real thing".

In science education, for example, we expose students to science textbooks instead of, say, to scientific text; to science teachers instead of to scientists; to school laboratories instead of to scientific and technological workplaces. Simplified equipment, simplified procedures and processes, whether intellectual, conceptual, or manual will not suffice. They may have a function as *adjuncts* to learning, *once* students have already participated in the actual social practices being taught, but we cannot expect them to function, as they do now, as *substitutes* for such direct participation. It is only *after* we have learned how, say, science and technology operate in our communities in real laboratories and workplaces that we can intelligently participate in the construction of correspondences and similarities between what happens there and what happens in science classrooms or school laboratories.

Curriculum designers (rarely teachers, and almost never students) are typically people who have already learned how to construct these conventional similarities between textbook language and the working language of a discipline, between classroom demonstrations and actual phenomena or working professional procedures, between teachers of a subject and those who practice it outside of schools. They can do this because, hopefully, they have actual firsthand working knowledge of professional practices outside the context of education (in the contexts of production and use). But many teachers and most students do not have such experience. Curricula which assume that they do not need it, that it is sufficient to form abstract concepts based on inherently similar textbook and classroom examples, are based on fundamental episte-mological fallacies. These similarities, too, must be constructed by learned cultural procedures; they are not inherent in the instances. They are not "the same as", and they are "like" the real thing for us only AFTER we learn how to compare them TO the real thing.

Yes, humans do pattern recognition. But we must learn to think of it not as "pattern recognition", but as pattern construction.

Since we construct patterns in the context of a culture, a community, and its pervasive habits of making some kinds of meanings rather than others, we do learn to make some patterns, construct some kinds of similarities rather than others, in ways peculiar to our own community. We do this in very small steps, learning to add each new category of examples to all the others in a special new way, building up toward being able to see the similarity in all that our traditions have taught us to painstakingly construct. We do not do it in great, impossible abstract leaps. There are no guide wires of self-evident similarities to lead us only to safe landing-sites when we leap for such conclusions.

Can we learn to leap further? at least in retracing the paths made step-by-step by our cultural predecessors? (Or better think of this as a developmental recapitulation of our historical phylogeny, not driven from the inside alone, but also by the environment with which what is inside us evolved to cooperate). Some very few of us do seem to take longer leaps and land more or less where our cultural traditions say we should. One way of understanding this is as a process of "meta-construction," in which we are guided by a learned sensitivity to the cultural habits of meaning-making that are all around us. (At least they are all around us if we are middle-class, male, etc.)

By meta-construction I do not mean what is misnamed "meta-cognition" and is really no more than self-monitoring, glorified, like self-regulation and self-discipline, by the value system of a particular, influential subculture in our society. I mean, rather, the sort of process originally envisioned (for dolphins, in fact) by Gregory Bateson (1972): that we construct patterns *of* patterns. Having seen how our culture constructs some kinds of similarities rather than others, according to some kinds of principles rather than others, some of us come to embody in our neurological and behavioral dispositions a successful model of these patterns, and through it we invent new similarities, on old grounds, that can be understood and accepted by others and integrated into the meaning-making practices of our community. That is, everybody thinks we must be very smart.

So, for example, when we seem to "catch on" to an abstract principle, when we guess right about how to apply a generalization to a new class of instances, we may not in fact have acquired a flexible intellectual tool at all. We may simply be following a kind of learned habit of a higher order, making what is truly just an "educated guess". When schools and teachers praise and reward those who have this knack, we are discriminating in favor of the already socially privileged, because the only way you can have this knack is by catching on to the meaning-making habits of the dominant groups in our society and its history. If we call it intelligence, and assume it is an immutable characteristic of the individual, we will never take the trouble to teach these meaning-making procedures, step-by-step, to all the others.

At some level, most members of a community do learn, though not consciously, to construct such higher-order patterns. We can tell whether something seems culturally "alien" or not (perhaps this is even the basis of the much debated "grammaticality judgments" of native speakers about language). But the patterns-of-patterns we learn to construct are those of "our culture" in the narrow sense: the subculture we live in every day. That is not the same culture for all of us in our diverse and heterogeneous society. Even so, very few of us seem to learn to use this facility at all consciously to make new patterns, or to do what we value so much (and see so little) in education: anticipate the conventional way to make a particular pattern that has evolved in the history of our culture, before you are shown how. This facility exists, but we have misused it as evidence that what we have called abstract conceptual learning is the norm. It is almost as rare as genuine intellectual creativity, and for exactly the same reasons.

Too many of us pride ourselves that we have this facility because we have, finally, eventually, and after much struggle, reconstructed after-the-fact ways of making all these similarities seem natural. Often we achieved this only years after it was taught to us by methods which assumed that we should have easily been able to catch on, to "see" the inherent similarities that were *there* in front of us, so evident to our teachers, who had themselves similarly struggled for years to see them. Most of us can remember blaming ourselves for not being able to "see" abstract relations that our teachers assured us were "there" and which they were confident we "should" be able to catch on to after two or three examples. Many of us perpetuate this fallacy and its painful frustrations with our own students.

Postmodernism, constructivism, and social semiotics are not here to make our lives tough. Modernism, positivism, and abstract conceptual learning theory have already done that. We deserve a break. And so do our students.

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Resumen. El modernismo cree en el saber objectivo como realidad fuera de la percepción humana, durante el postmodernismo discurre que la realidad es un concepto

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cultural hecho por el uso de las tres herramientas de deconstrucción, fenomenología y semiótica. La deconstrucción trata de monstrar como "objetos veraderos" se sintezan como conceptos útiles y aceptables a miembros de una cultura. También la fenomenología critica la ciencia por su vista muy restrictiva de vida. La semiótica como una generalización de la lingüística analisa como culturalmente le damos sentido y significado a nuestro mundo y sus objetos.

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Effectiveness of Accelerated Learning as a Tool to Facilitate a Maintenance Paradigm Shift.

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Abstract. Pumps Running is a program that DuPont is using to promote a corporate culture change in the maintenance of pumps and other equipment. This is an evaluation of the effectiveness of DuPont's implementation of the Pumps Running program in a Learning Lab format using Lozanov's approach to accelerated learning. The results achieved will be compared to the results of a base case of no Pumps Running exposure and also compared to the results of a lecture approach. Various theories and approaches that were incorporated into the Pumps Running Learning Labs and the roles they played in the program's success will be discussed.

The Learning Labs are not a typical implementation of accelerated learning, where the goal is to teach the participants new skills. The objective of this program is to institute a culture change throughout the corporation which will change the way that participants view their role in defect elimination and equipment maintenance.

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Introduction. The cost of products, the profitability of our industry, and the overall quality of life in a manufacturing facility are all directly related to the effective and efficient operation of our manufacturing processes. One of the key factors affecting the operation of these processes is the maintenance of the equipment. Much of the industry in the United States lags behind industry in other countries because our maintenance is less proactive than it should be. This is best seen in the often heard assertion: "If it ain't broke, don't fix it!" This pronouncement represents an attitude of remedial maintenance as opposed to one of preventive and predictive maintenance. It leads to a maintenance approach that results in a significant increase to the cost of manufacturing.

DuPont has been pursuing a program to change the maintenance culture at our manufacturing sites to one that is more proactive. This program is called Pumps Running. The intention is to expose workers at our manufacturing sites to the values and benefits of proactive maintenance. The theory is that when these benefits are understood and the technical knowledge is widely available, people will pursue proactive maintenance and the company will reap the benefits of reduced breakdowns and improved process utility.

Scenarios Studied. Our study examined progress made in three different scenarios: the base case - no exposure to a Pumps Running program, the conventional training approach - exposure to the Pumps Running philosophy using the lecture method, and the Learning Lab approach - exposure to the Pumps Running philosophy in a Learning Lab developed around the principles of accelerated learning. In each case, we compared the maintenance histories of equipment maintained by those teams in the scenario.

The base case teams maintain their equipment using a standard approach. It is primarily remedial maintenance with a small amount of preventive and predictive maintenance. This is a common practice in industry in the United States and the teams are working in the way that they believe to be most productive. These teams have not been exposed to the Pumps Running principles through either the lecture method or the Learning Lab method. There are 19 teams that have been analyzed in this scenario. Since in this scenario no one has directly worked with the teams, there is a great deal of variety in their learning rate.

The second group of teams has been exposed to the Pumps Running principles using a conventional approach centered around the lecture method. These teams have seen the value of proactive maintenance and have been provided with the technical knowledge to perform preventive and predictive maintenance. They are combining these new approaches with their traditional approach toward maintenance, resulting in the maintenance approach that they believe will be most productive. This scenario is represented by the two teams who have participated in the Pumps Running program but have not attended the Learning Labs. They attended Pumps Running lectures.

The third group of teams attended Pumps Running Learning Labs. These teams were exposed to the value and benefits of proactive maintenance through an interactive learning environment based on Lozanov's accelerated learning (AL) cycle and a combination of other learning theories. At the end of the learning labs, these teams returned to their manufacturing sites to do maintenance in a proactive way. This scenario is represented by the 8 teams that participated in Pumps Running Learning Labs so far.

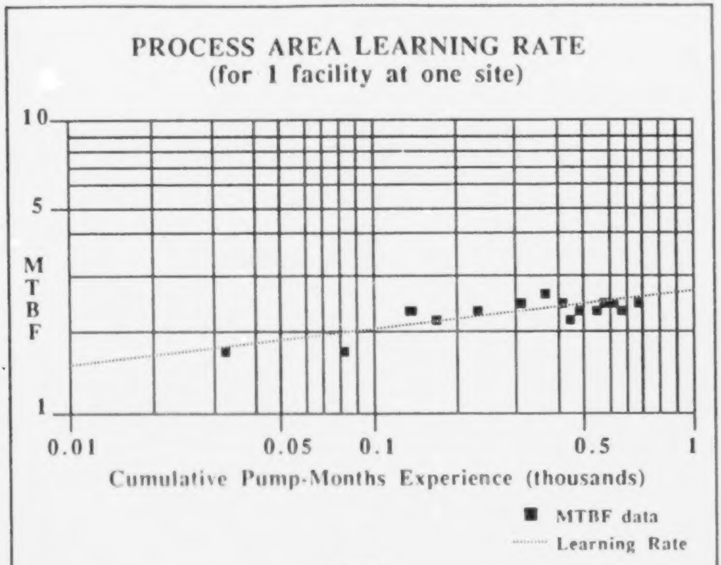
PROCESS AREA LEARNING RATE
(for 1 facility at one site)
10
5
1
MTBF
0.01
0.05
0.1
0.5
1
Cumulative Pump-Months Experience (thousands)
■ MTBF data
Learning Rate

Figure 1

The Evaluation Process. The tool used to evaluate maintenance effectiveness was a study of the learning rates for various manufacturing facilities. These learning rates represent an improvement in the Mean Time Between Failure (MTBF) for the equipment. Learning rate is defined as the slope of the line when average MTBF (y axis) is plotted versus Cumulative Pump-Months Experience (x axis). When this data is plotted on a log-log graph the result is a straight line (see Figure 1).

Mean Time Between Failure is calculated only for those pumps that are part of the program. This means that they have been repaired since the team received Pumps Running training and the MTBF is calculated since that repair. Cumulative Pump-Months Experience is the sum of all of the months that all of the pumps have been in the program.

The Results. Although the quantity of teams in each of the scenarios is small, the results are quite notable. The use of accelerated learning techniques in the design and implementation of the Learning Labs resulted in a major improvement in the MTBF of the team's pumps (see Table 1). For the base case, teams that were not exposed to the Pumps Running principles, the average learning rate was -3.5 %. The negative value implies that their MTBF was actually decreasing, resulting in greater equipment downtime. Those teams who were exposed to the Pumps Running principles through conventional training (lecture method) showed a significant improvement with a learning rate of 7%. When the teams were exposed to the Pumps Running principles through the accelerated learning based Learning Labs, the learning rate was 13.8 %. This is approximately twice the learning rate from the conventional training approach.

Table 1. Learning Rates Comparison

Base Cases (non-Pumps Running)	-3.5%
Traditional approach (Pumps Running)	7.0%
Learning Lab approach (Pumps Running)	13.8%

A manufacturing area that increases its MTBF will see a decrease in their maintenance costs and manpower requirements. For example: A process area currently needs $200,000 per month to maintain its pumps and the area has an MTBF for those pumps of 4 months. It then improves its maintenance performance and increases this performance to an MTBF of 8 months. This will result in a corresponding reduction in costs to $100,000 per month.

Integration of Learning Theories. The team responsible for developing Pumps Running in DuPont received their training in accelerated learning from Charlotte LaHecka, Director of the University of Houston's Continuing Education Program. This training included Lozanov's accelerated learning theory and also a number of related theories. Lozanov's accelerated learning theory provided the framework in which the Learning Labs were designed. Other theories were integral pieces to the success of the learning labs.

Among these theories was The Seven Intelligences (Gardner, 1985). This theory played a major role in the design of the activities throughout the Learning Lab. By considering the different intelligences used by potential participants (Interpersonal, Intrapersonal, Bodily-Kinesthetic, Linguistic, Mathematical/Logical, Musical and Spatial) the Learning Lab could be designed to appeal to all of them.

The Triune Brain theory (MacLean, 1985) was incorporated into the design by providing an environment that considered the physical needs of the "Reptilian Brain." The Learning Lab design also considered the needs of the "Mammalian Brain" through well- constructed opening activities designed to increase the emotional comfort level of the participants.

Once these needs were all met, it was then possible to develop activities to engage the participant's "Neocortex" with minimal obstruction from the "Mammalian" and "Reptilian Brains"

The Four Learning Styles (Kolb, 1985) furnished a framework that considered the needs of participants with each of the four different learning styles (Accommodator, Assimilator, Converger and Diverger). This resulted in a Learning Lab that provided opportunities for Accommodators to ask "What if" and to try various approaches, while concurrently providing concise instructions to meet the "What" needs of the Assimilators. The Learning Lab also provided the level of structure and detail necessary to satisfy the Converger's need for "How", while supplying background information to meet the Diverger's need for "Why."

The combination of all of these theories with the AL cycles provided a Learning Lab where all participants, regardless of their own personal learning needs, would have a positive and productive learning experience.

The Hero's Journey. In addition to the learning theories, one theory that has proved invaluable in understanding the mental states of the participants has been the Hero's Journey (Pearson, 1991). This theory predicts

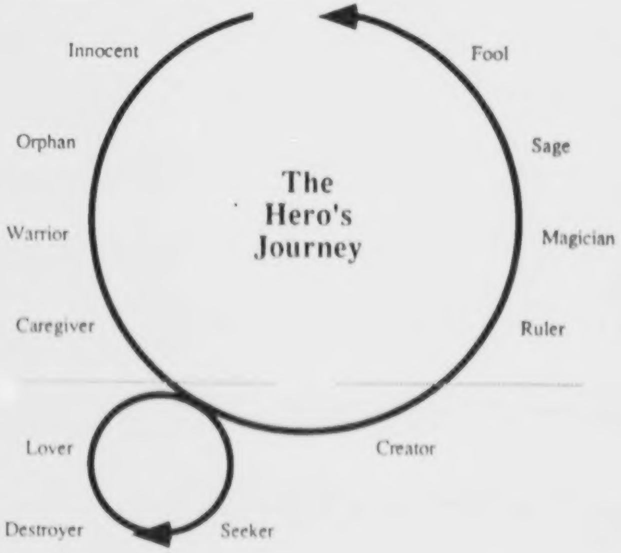
Innocent
Fool
Orphan
Sage
The Hero's Journey
Warrior
Magician
Caregiver
Ruler
Lover
Creator
Destroyer
Seeker

Figure 2

that a participant on any journey will traverse 12 distinct archetypes of behavior before they reach the end of their journey (see Figure 2). This theory helped the Pumps Running design team understand why the participants behaved the way they do at various stages of the AL cycles in the Learning Labs.

Upon arrival, the participants are very naive about the process they are about to experience. They are in the INNOCENT stage of their Hero's Journey. As they begin to perceive the journey, through the Introduction and the Overview of the first AL cycle, and they begin to face the challenges of the journey, they experience the ORPHAN stage of their journey. Through the Active Concert and the Primary Activations of the first AL cycle in the Learning Lab the participants begin to gather allies, and have moved on to the WARRIOR stage of their Hero's Journey. As they support each other they progress through CAREGIVER and they have reached the first threshold. This is the point where they must decide if they are willing to make the journey and accept the risks involved. As they face their deeply held beliefs about maintenance during the Secondary Activations in the first AL cycle, they move through the Road of Trials and they rotate through the SEEKER, DESTROYER and LOVER archetypes of their

Hero's Journey. During the second AL cycle of the Learning Lab the participants experience the CREATOR archetype. This is the point where they determine their intended path forward and identify actions that they will take to help catalyze the culture change at their manufacturing site.

At the conclusion of the Pumps Running Learning Lab, the participants are facing their second threshold. This is the threshold back to the manufacturing site. This is the time when they must take their newfound beliefs back to the real world. As they progress through the archetypes of RULER, MAGICIAN, SAGE and FOOL, they implement their new beliefs and share them with others.

This theory explains the many stages on the journey that the participants experience during the Learning Lab and also on their return to the manufacturing sites. It helps explain why some participants are never able to cross the thresholds, and why some sites have difficulty implementing the culture change.

Systems Thinking. Another theory that played a major role in the development of the Pumps Running Learning Labs is Systems Thinking. This theory provided the basis for considering defect elimination as a problem in the manufacturing system rather than a problem specifically of maintenance or operations. The use of a systems thinking modeling tool: ITHINK, enabled the development team to model the manufacturing process. This model was then used as the basis for the Manufacturing Game.

The Manufacturing Game is the Secondary Activation in the other AL cycle of the Learning Lab, and it is the core around which the rest of the Learning Lab was built. The game provides an opportunity for the participants to operate their facility using different maintenance paradigms with no risk. They are able to try new approaches and discover first-hand which ones are successful and which ones are not.

The Learning Lab. The Learning Lab consists of two AL cycles (see Table 2). Typically it begins at 3:00 PM on the first day, and continues to 10:00 AM on the fourth day. The days are long (usually to 9:00 PM each night) but there are frequent breaks and long lunch and dinner breaks. The team participating in the Learning Lab is a natural work group at the manufacturing site. It consists of mechanics and operators, engineers and materials procurement personnel who all work together ultimately to produce the product. The Learning Lab is conducted at scenic locations away from the work environment. This results in an increased level of comfort, a reduction of serious distractions, and a reduction in inhibitions related to the Learning Lab activities. There are multiple Introductions, Primary and Secondary Activations, and Passive Concerts in each of the AL cycles. In total, there are two skits, two games, and a song that were all written for the Learning Lab. Throughout all of the steps in the AL cycles of the Learning Lab the recurrent theme is defect elimination.

At the conclusion of the Learning Lab, the participants have tested their deeply held beliefs towards maintenance. They have tried different approaches to maintenance and have usually modified their beliefs toward increased proactive maintenance and increased emphasis on defect elimination. In addition to introducing and reinforcing improved maintenance habits, the experience has enabled the participants to become a more cohesive team. The level and quality of group interaction increases.

When they return to the manufacturing site they spread the new culture to their coworkers. They apply what they have experienced in the Learning Lab not only to pumps but other pieces of equipment as well. Their management frequently provides members of the team with the authority to make the appropriate changes in work practices and

Table 2. Learning Lab Structure

Introductions	Interactive activity: Paper hat folding with defective materials & instructions.
Overview	Skit: Why the gondoliers in Venice sing? Addressing sources of defects.
Active Concert	Reading to classical music relating to defect elimination.
Primary Activation	Matching game based on the characters in the skit. Interactive activity: Paper hat folding without defective material.
Passive Concert	Reading to baroque music of a description of the future.
Primary Activation	Brief lecturette relating defect elimination to "Manufacturing Game".
Secondary Activations	Manufacturing Game strategy planning. Manufacturing Game playing. Manufacturing Game debriefing.
Passive Concert	Reading to baroque music as closure to playing the Manufacturing Game.
Introductions	Discussion about defects causing business problems at their manufacturing facilities. Brief lecturette presenting how this effort will be expanded to cover additional equipment.
Overview	Skit: King Edgar's Pie. Addressing the need for teamwork and cooperation between the functions.
Active Concert	Reading to classical music regarding communication and teamwork.

Primary Activations	Brief lecturette about their team's organization: The "Running Pump Club".
	Brief lecturette about workmanship and materials.
	Group song: 50 ways to make your pump run.
	Game to emphasize the effect of defect elimination: the "Tub & Bucket" game.
	Interactive activity to identify those categories of defects to be pursued: The Italian Restaurant ordering exercise.
Secondary activation	Action list generation.
Passive Concert	Reading to baroque music about the Visualization of defect free equipment.

acquire necessary tools without management approval.

Reaction of the attendees. Accelerated learning and the AL cycle present the participants with a very different learning environment than they have been exposed to throughout their life. Initially the developers were very concerned about the reaction that would occur when adults in their 50's and 60's were exposed to the learning techniques of the AL cycle. These concerns were unfounded. The participants were very responsive, and seemed to enjoy the variety and high energy level present in the Pumps Running Learning Labs. There were a few individuals who refused to participate in some of the activities, such as Passive Concerts and the skits, but in general the participants became deeply immersed in the entire process. It is believed that this was in part due to the Learning Labs' being conducted at locations remote from the manufacturing sites. This remoteness provided a secluded and protected environment where the participants could feel free to pursue their curiosity, ignore their inhibitions, and try new ideas in a low-risk environment.

We also had the opportunity to examine the effects of management support on the productivity of the Learning Labs. Those teams that did not have the clear and complete support of their management were less successful at implementing the changes that they had identified as action items. Management support was directly related to the level of commitment of the participants, the cohesiveness of their team, and their enthusiasm they displayed in meeting the challenges. The most common questions from the team members were: "Are our managers really going to let us do this? Are our managers going to listen to us when we tell them that their short term costs are going to increase in return for significant long term savings?" In a few cases it was necessary to bring their management to the Learning Lab for an evening, to demonstrate their commitment and to address the concerns of the participants.

Conclusion. Accelerated Learning as a vehicle for focusing on proactive maintenance has resulted in a significant improvement in the maintenance culture at our manufacturing facilities. The Learning Labs demonstrate that accelerated learning is a viable tool for applications beyond the traditional applications of teaching skills. This approach has produced a learning rate improvement double that of conventional training. It is also obvious that there are additional theories which play an important role in the process of changing a culture. In combination, these tools provide a powerful experience for the participants and enables them to meet the oncoming challenges that resist changes to their culture.

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Resumen. Bombas Corrientes es un programa que DuPont usa para promover un cambio cultural y corporativo en el mantenimiento de bombas mecánicas y otro equipo. Esto es una evaluación de la eficacia de la implemen-

tación en DuPont del programa Bombas Corrientes en un formato de Laboratorio de Aprendizaje que utiliza el acercamiento de Lozanov a aprendizaje acelerativo. Las resultas ganadas se comparan con las de un caso controlo sín exposición a Bombas Corrientes y también con las resultas de un acercamiento en clase. Se discuten varias teorías y acercamientos en el lab de Bombas Corrientes y los papeles hechos en el éxito del programa. Los Laboratorios de Aprendizaje no son una implementación típica de aprendizaje acelerativo, en donde la meta es el enseñar de nuevas destrezas a los participantes. El objeto de este programa es de iniciar un cambio cultural por toda la corporación que cambiará la manera en cual los participantes miran sus papeles en la eliminación de defectos y el mantenimiento de equipo.

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The Effectiveness of Suggestive Accelerative Learning Techniques Applied in Teaching Underprepared College Freshmen at a Two-Year Technical School

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Abstract. The researcher studied the effects of Suggestive Accelerative Learning Techniques on the success of freshmen college students enrolled in study skills classes at a two-year technical school. The study was conducted using a quasi-experimental, nonequivalent control group 2 x 2 x 2 design. Five class sections taught by the researcher participated in the study; two sections were taught using traditional instructional methods and three were taught using the Suggestive Accelerative Learning Techniques. The Learning and Study Strategies Inventory was the instrument chosen for the study. Analysis of the data indicated no significant main or 2-way interaction effects at the .05 alpha level. Several interesting observations were made by examination of the data which are suggestive of the need for further research.

* * *   * * *   * * *

One cannot open a newspaper or magazine or even listen to the news without hearing about the ills of the education system in America. The media report to the public that students' SAT and ACT scores are in a state of decline. However, the phenomena of adult illiteracy and academic underprepar-edness is certainly not new to this century. Maxwell (1979) discussed Henry P. Tappan's 1852 inaugural address as president of the University of Michigan:

> Henry P. Tappan ... stated that American colleges were too much involved in teaching rudimentary courses that belonged in intermediate or even primary schools and that universities were lowering their standards by admitting poorly prepared students. (p. 7)

Then as now, there were first year college students who were unprepared academically for entry-level college classes. Today, these students are referred to as at-risk, high-risk, developmental, remedial, and underprepared. These students may be older (non-traditional students) or may even consist of younger students (traditional students). Regardless of age, underprepared students are students lacking the necessary skills to succeed in college entry level courses, putting them at risk of dropping out before completing their degrees. The term "high risk" is not an indicator of a student's intellectual abilities but rather his/her, " . . .inadequate or inappropriate environmental and educational experiences" (Evans & Dubois, 1972, p. 39).

To meet the needs of these underprepared students, developmental programs were implemented in many institutions of higher education. Remedial programs can be found in public and private institutions as well as in two- and four-year universities. Ninety percent of two-year colleges and 64 percent of four-year colleges offer remedial classes. A 1989 national survey of post-secondary institutions offering collegiate remedial/developmental courses showed that thirty percent of entering first year college students were enrolled in at least one remedial course during the fall of 1989 (Mansfield, Farris, & Black, 1991).

The scope and purpose of developmental education, as the name implies, is to develop the skills and abilities of the students. In post-secondary institutions this development is sometimes extended to include a holistic curriculum to meet the needs of the whole student. Roueche and Roueche (1977) defined developmental education as follows:

> Developmental cannot be characterized by a limited definition of verbal and

> quantitative skill remediation for the low-achiever. It spans a wider base. It signifies (1) efforts to take a student from where he is to where he wants (needs) to go, and (2) efforts to provide both the academic and the human skills to make that movement. (p. 3)

The College Board publication *Academic Preparation for College: What Students Need to Know and Be Able to Do* (1983) asserted that students without strong study skills will not be able to acquire the other five competencies and are, " . . . unlikely to be efficient in any part of their work without these study skills" (p. 10). Meador (1984) surveyed 52 post-secondary institutions to ascertain what types of programs they offered to non-traditional students, particularly older students. Based upon information from the survey and an extensive review of literature, Meador designed guidelines for student personnel services. Meador (1984) concluded that, "Administrators must customize existing academic support services to meet the diverse needs of the nontraditional students in terms of offering specialized workshops and courses, study skills reinforcement, counseling, and test-taking skills development" (p. 1).

Entwisle (1960) reviewed 22 evaluations of study skills courses and concluded that some sort of improvement is experienced by students who take a study skills course. Tryon and Sy (1977) found that non-traditional (older) students benefited from a study skills class. Subjects receiving the treatment (the study skills class) increased their study habits and decreased their anxiety toward school.

Underprepared students need study strategies in order to develop and improve their skills in the various disciplines. Doctoral studies have examined the effectiveness of teaching study skills to post-secondary students (Evans, 1984; Jones, 1988; Taylor, 1988; Underwood, 1982). A review of studies indicates teaching study skills to students is effective in improving study strategies. Research in the discipline of developmental education has focused on the efficacy of study skills classes relative to underprepared students (Lee, 1989; McGee, 1980; Tryon & Sy, 1977). In each of these studies, traditional methods of teaching were used in the study skills classes.

However, a relatively new teaching method, Suggestive Accelerative Learning Techniques (SALT), has emerged. This method offers a holistic approach to teaching. "The essence of this technique is using an unusual combination of physical relaxation exercise, mental concentration, and suggestive principles to strengthen a person's ego and expand his or her memory capacities while material to be learned is presented dynamically with relaxing music" (Schuster & Gritton, 1986, p.1). It is beyond the scope of this paper to present an historical overview regarding SALT; however, background information is provided to show the relevance of this method to teaching college study skills to underprepared freshmen.

Suggestive Accelerative Learning Techniques are the American version of Dr. Georgi Lozanov's Suggestopedia. Suggestopedia is rooted in the science of Suggestology and both are defined by Lozanov (1978):

> Suggestology is the science of the art of liberating and stimulating the personality both under guidance and alone.
>
> Suggestopedy is suggestology applied in the process of instruction. (p. vi)

In order for learning to take place, positive communication between student and teacher has to occur. Positive communication is defined by Laborde (1988) as, "Any interaction that leaves all participants energized, feeling resourceful, appreciated, and validated for their contributions" (p. 259). Lozanov (1978) identified three barriers which hamper communication between student and teacher: the critical logical barrier, the intuitive-affective barrier, and the ethical barrier. Lozanov's theory is based upon three intertwined influences -- psychological, didactic, and artistic. These influences working together, go through, break down or 'desuggest' the barriers to foster positive communication.

The psychological principles encompass many areas. The SALT/ Suggestopedia classroom is one that is positive. A warm and open physical environment is created. According to Schuster and Gritton (1986) "The teacher organizes the lesson material psychoprophylactically, psychophysically and emotionally. Peripherally received communication is accepted non-critically" (p. 16). SALT teachers are trained to communicate in positive ways, to be cognizant of the effects of negative non-verbal communication, and to respond positively to students.

The didactic principle refers to how the instruction is organized. The lesson is organized in such a way to prevent boredom and increase retention. Some of the crucial steps of a Suggestopedia/SALT lesson are; introduction, presentation, globalization, practice phase, and review. The didactic principle overlaps with the artistic principle with the use of music. During the presentation phase, classical music is used in the background. Baroque music is played during the review phase. Suggestopedia teachers may also use other artistic mediums, such as artwork, to foster learning.

Simply stated, the goal of education is for students to learn. In order for students to learn, positive communication between student and teacher must occur. Using psychological, didactic and artistic principles, the Suggestopedia/SALT method creates an environment where positive communication between student and teacher occurs. Relaxation techniques, suggestion, and music are the tools used to reach beyond students' communication barriers.

A review of the literature showed no studies using SALT in teaching study strategies to underprepared students. However, there was a study at Kennesaw College where SALT was used to teach math to underprepared students (Prichard, 1986). A successful study conducted by Semke and Semke (1983) taught German to underprepared students to enhance reading skills.

The purpose of this study was to examine the effectiveness of the intervention technique. This study examined the effects of the intervention by comparing traditional study skills teaching methods with Suggestive Accelerative Learning Techniques. This study also examined the effects the independent, organismic variables of age and gender had upon the intervention. The intervention was a fifteen week long developmental study skills (DSS 0863) class taught at Nashville State Technical Institute (NSTI) located in Nashville, Tennessee.

Method

Institutional Setting

NSTI, located in Nashville, Tennessee, serves several diverse counties ranging from the metropolitan Davidson County to the more rural counties of Cheatham, Dickson, Houston, Humphreys, Montgomery, and Stewart. Total enrollment (including full and part time students) for the 1992 spring semester was 5,761; of these, 53% were males and 47% were females.

The Academic Development Department (ADD) at NSTI is specialized to meet the needs of remedial/developmental students. This department has fifty-five faculty members, of which twenty are full time. From this faculty pool, four or five may teach developmental study skills classes, dependent upon student enrollment. Of the 1,138 students enrolled in ADD classes for the spring semester of 1992, 569 were females and 569 were males. Students enrolled in developmental study skills classes were the focus of this study.

Subjects

The subjects of the study were 41 female students and 51 male students. The experimental group consisted of 56 students; the control group had 36 students. Of the total sample, 51 were between the ages of 18-20 and 41 were over the age of 21. The experimental group consisted of 31 students between the ages of 18-20 and 25 over the age of 21. The control group consisted of 20 students between the ages of 18-20 and 16 over the age of 21.

Design

This study was a quasi-experimental, nonequivalent control group, 2 x 2 x 2 design. A quasi-experimental design was chosen because the subjects could not be chosen randomly; each student chose a particular class section based on his/her class schedule. This is a non-systematic approach to subject selection.

Five sections of the developmental study skills class (DSS 0863), taught by the researcher, were used for this study. There were three class sections in the experimental group and two class sections in the control group. The rationale for choosing a class section to be an experimental or control group was based on a corresponding number of students enrolled in paired class sections to provide an equal number of students in each treatment situation; however, due to attrition it was not possible to maintain equal numbers in both treatment groups.

Instrument

The Learning and Study Strategies Inventory (LASSI) was the instrument chosen for this study because of the instrument's design and the reliability of the test. The LASSI has high coefficients of stability for each of its ten scales. In addition to high coefficients of test-retest stability, the instrument also has high alpha coefficients for the scales. The ten scales are attitude, motivation, time management, anxiety, concentration, information processing, selecting main ideas, study aids, self-testing, and testing strategies.

Procedures

DSS 0863 consisted of four units: Basic College Survival, Note-taking, Test-Taking, and Memory and Concentration. These units were based on the course text *How to Study in College* by Walter Pauk. Each unit lasted three to four weeks, with the exception of the final unit (test-taking), which lasted one week. There were three unit tests and a comprehensive final exam. Test questions were based on questions at the end of the chapter and on 80 to 100 test bank questions which covered a specific unit.

Results

The first scale, Attitude, measures a student's perspective regarding school and reflects the student's motivation to complete tasks associated with being a successful student. An ANOVA revealed no significant difference between treatment (experimental v control) on the attitude gain score. There were no significant main or interaction effects at the 5% level of significance.

The Motivation scale measures the effort or to what extent students are willing to exert to succeed in school. It measures the amount of responsibility a student is willing to assume for success. The analysis of variance indicated no significant difference between the groups (treatment, sex or gender) nor an indication of significant interaction effects. However, cell means on the three main effects, treatment, gender, and age decreased. Like attitude, these means decreased since attitude and motivation interrelate with each other. It is possible that this effect reflected in both scales' decreased means.

The Time Management scale measures a student's ability to create and effectively use schedules for academic success. An analysis of variance revealed no significant difference between treatment conditions. There were no significant main or interaction effects at the 5% level.

Cognitive worry and negative self-talk or Anxiety relative to academics is measured on this scale on the LASSI instrument. A low score on this scale indicates high anxiety. An analysis of variance indicated no significant effects occurred.

The Concentration scale measures a student's ability to concentrate and to focus attention on academic tasks (LASSI, 1987). An analysis of variance revealed no significant difference between treatment groups; there were no significant main or interaction effects at the 5% level.

A student's ability to process information into meaningful classification systems for the purposes of understanding and synthesizing material was measured on the Information Processing scale. An analysis of variance at the alpha level of .05 revealed no significant differences between treatment groups, gender, or age. Further, there were no significant interaction effects.

The Selecting Main Ideas scale measures a student's ability to decipher and identify the main ideas from textbooks and lectures. An analysis of variance at the .05 alpha level revealed no significant differences between groups, genders, or ages. There was a significant interaction for the Gender x Age effect: F = 8.23, df = 1/84, p < .005 The data indicated that older females (N=21) had a higher mean gain score (M = 3.05) than younger females (N = 20, M = 0.05). Younger males (N = 31) had a higher gain score (M = 1.94) than older males (N = 20, M = 0.55) at .05 alpha level. See Table 1.

The Study Aids scale measures a student's ability to create study aids and to utilize existing study aids to learn material. An example of an existing study aid would be the typographical emphasis in textbooks; an autonomous study aid would include correctly marking passages in textbooks. An analysis of variance indicated no significant main or 2-way interactions. See Table 2. There was a significant 3-way interaction effect for Group x Gender X Age: F = 6.90, df = 1/84, p < .01

The Self Testing scale measures a student's ability to test their knowledge regarding material learned, as well as reviewing material for comprehension. An analysis of variance indicated no significant differences between groups, genders, or ages. No significant interaction effects were found.

Table 1. Source Table for Analysis of Variance for the Selecting Main Idea Scale's Gain Score

Source	SS	df	MS	F	p
Groups, Experimental vs. Control	.00	1	.00	.00	.988
Gender	.09	1	.09	.01	.938
Age	9.90	1	.016	9.90	.413
Group x Gender	30.16	1	30.16	2.06	.155
Group x Age	11.17	1	11.17	.765	.384
Gender x Age	120.29	1	120.29	8.23	.005
Group x Gender x Age	.109	1	.109	.007	.931

Table 2. Source Table for Analysis of Variance for the Study Aids Scale's Gain Score

Source	SS	df	MS	F	p
Groups, Experimental vs. Control	.47	1	.47	.015	.902
Gender	1.68	1	1.68	.06	.814
Age	16.59	1	16.59	.547	.462
Group x Gender	1.34	1	1.34	.04	.834
Group x Age	1.88	1	1.88	.062	.804
Gender x Age	39.59	1	39.59	1.30	.257
Group x Gender x Age	209.19	1	209.19	6.90	.010

Conclusion

Neither the SALT method nor the traditional method made any significant gains; however, there were some noteworthy mean gain scores on the Anxiety scale. The experimental group did have a larger mean gain score on the anxiety scale but it was not significant at the alpha level of .05. Older students had the highest mean gain score on the Anxiety scale. The next highest mean gain score was for older females in the experimental group.

The other scales, Concentration and Information Processing, had marginal to nominal positive mean gain scores to some very small negative mean gain scores. Again, there were no significant differences at the .05 alpha level.

There was an interaction effect on the scale of Selecting Main ideas; older females had a more significant gain than younger females. This indicates that older females had higher posttest scores than younger females. In this condition, the interaction effect does not distinguish between control and experimental groups.

A significant interaction effect at .05 alpha level was found on the Study Aids scale. On this scale young females in the experimental group had a positive gain score. Young males in the experimental group almost had a completely diametrical opposite gain score than that of the young females of the same group. In the same diametrical vein were the mean gain scores for the experimental group's older females who had a low mean gain score in comparison to the control group's older males with the higher mean gain score. The findings indicate that SALT was more effective for teaching young females and older males how to use study aids.

In conclusion, the findings of this study indicate that females, upon completion of the course, experienced less anxiety than males but not at a significant alpha level of .05. The question that arises from this condition is whether the females had a higher anxiety level to begin with than males. This would explain the higher mean gain scores. The literature and the findings from this study indicate that further research should be conducted regarding the anxiety levels of underprepared males and females, and the use of SALT in teaching study aids and selecting main ideas should be explored.

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Resumen. La investigadora estudiaba los efectos de aprendizaje acelerativo en el éxito de novatos universitarios quienes se alistaban en clases de la destreza del estudiar en un colegio técnico. Se conductaba el estudio usando un diseño 2x2x2 con un grupo controlo cuasi-experimental y no-equivalente. Cinco secciones enseñadas por la investigadora participaban en el estudio; se enseñaban dos secciones con métodos tradicionales y tres con técnicas SALT. El Inventorio de Aprendizaje y Estrategias del Estudiar fue el criterio. Aunque el anális de resultas no indicó ninguna diferencia significante entre grupos al nivel .05, unas observaciones interesantes se sugerieron por la examinación de los datos cuales indican la necesidad de adicional investigación.

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Video-Taped Instruction Creates Listening and Visual Memory Integration For Higher Reading and Math Scores

By Jan Erland
Mem-ExSpan Accelerated Learning System

Abstract. This pre-post quasi-experimental study was conducted in a public school 5th grade class to determine the effects of video-taped instruction in teaching analysis and pattern finding skills. Methodology included guidelines from Cognitive Behavior Modification, Suggestopedia, and Guilford's Structure of Intellect Model within the Kaufman and Kaufman Sequential vs. Simultaneous Dichotomy. Elements of simultaneous and sequential learning, modeling, and self-monitoring were foundation components of *The Patterns and Systems Training*. The hypothesis was to determine if improved cognitive skills to create higher-order thinking skill would facilitate reading improvement. Standardized cognitive skills tests were administered pre- and post-training to determine if improved simultaneous and sequencing skill would generalize to improved

reading capability measured on the district's nationally standardized academic achievement tests. Gains at significant levels were obtained by the video-taped *Patterns and Systems Training* group in the Reading and Math subtests on the Science Research Associates (SRA, 1985) standardized tests.

* * *   * * *   * * *

A great demand exists for the teaching of higher-order thinking skills so students can excel in science, mathematics and comprehend complex reading information. Higher-order thinking skills depend upon specific cognitive underpinnings. Often, these foundation levels of higher levels of memory and cognition are missing. (Hessler, G., 1982; Woodcock, R. W., 1978; Meeker, M. N., 1969; Guilford, J. P., 1967). Let's consider the findings of the National Assessment of Educational Progress (NAEP) testing in 1986 and 1988 (Mullis, V. S., Owen, E. H. & Phillips, G. W., 1990):

More than one-quarter of all 13 year-olds were unable to add, subtract, multiply and divide using whole numbers or solve one-step math problems.

Nearly 94 percent of high school seniors were unable to solve multi-step math problems or use basic algebra.

Almost 60 percent of high school seniors were unable to understand and summarize complicated reading material written above the 5th grade level.

In addition to problems with academic learning, students lack higher-order thinking skill needed for advanced academic levels. When teachers attempt to teach problem-solving skills, they are often faced with students who lack the information processing capabilities to think at advanced levels (Baker, P., 1991).

This study was undertaken to determine whether video- and auditory-tape instruction of cognitive skills training could enhance higher-order thinking skill leading to improved reading academic achievement scores in a classroom setting. It was hypothesized that the Experimental group receiving the cognitive training would significantly improve their cognitive processing skills, resulting in improved reading performance as measured by a standardized achievement test. This study would determine if improved cognitive skills results obtained in a private, carefully controlled setting in an earlier published report (Erland, J. K., 1989a), could be replicated in a typical 5th-grade classroom, using the same videoed life-size characters and a video monitor in place of the teacher, to improve reading scores.

Therefore, this paper proposes that deficient underlying mental abilities can be identified and improved through pattern-detection and sequencing systems (analytical skill) training, hereafter referred to as *Patterns and Systems Training.* It can be asked, after identifying weak cognitive information processing areas, and improving them, can reading comprehension improve? Additionally, these abilities can be isolated and evaluated to determine their impact on higher order thinking skills. If we do this, mathematics, science, written language and computer skills will become easier to teach and learn (Guilford, J. P., 1988; Meeker, M. N., 1991, 1969).

When students lack an adequate foundation of mental skills, little progress can be made teaching higher-order thinking skills (Ruggerio, V., 1988; Sternberg, R. J., 1985; Woodcock, R. W., 1978; Meeker, M. N., 1991, 1969). Field testing in public school classrooms reveals that many children have at least one deficient primary information processing avenue (Innovative Learning Systems, Inc, 1988-1990). Usually a student is either a visual or auditory learner, but seldom both. Higher-order thinking skills require the integration of both operable visual and auditory pathways using kinesthetic methods (Feuerstein, R., 1988; Hessler, G., 1982; Woodcock, R. W., 1978). It would appear logical to consider retraining weaker learning pathways (Feuerstein, R., 1988; Meeker, M. N., 1991, 1969).

Theoretical Background of Video Cognitive Skills Training

The combination of the following four well-known theories were incorporated in the procedures in this study:

1. Guilford's Structure of Intellect (Guilford, J. P., 1967)
2. Cognitive Behavior Modification, CBM (Meichenbaum, D., 1977)
3. Suggestopedia (Lozanov, G., 1978)
4. Simultaneous vs. Sequential Dichotomy (Kaufman, A. & Kaufman, N., 1983).

Principles from the following four theories were incorporated into the procedures:

Structure of Intellect Model (Guilford, J. P., 1967).

J. P. Guilford identified 150 different intellectual abilities and formed a model of working intelligence. These abilities are divided into content categories of intelligence operations. The Structure of Intellect Model is divided into five contents: Visual, Auditory, Symbolic, Semantic and Behavioral. The outcome products are divided into six categories of: Units, Classes, Relations, Systems, Transformations, and Implications. The five mental operations are: Evaluation, Convergent Production, Divergent Production, Memory, and Cognition. The model was designed to bring about the transfer of interlocking mental skills to applied learning.

Dr. Guilford received a number of honorary recognitions for this model. The American Psychological Association granted him *The Distinguished Scientific Contribution Award* in 1964, and its first *Richardson Creativity Award* in 1966. Another award was *The Distinguished Scholar Award* from The National Association for Gifted Children, and *The Gold Medal* from The American Psychological Foundation in 1983.

His psychology graduate student at the University of Southern California, Mary Meeker (1969), designed a cognitive skills retraining program now widely implemented in U.S. and Japanese public school systems (Guilford, J. P., 1984). This was among the first research in intelligence improvement applied to practical learning.

Cognitive Behavior Modification (CBM).

CBM was developed with the theoretical input of several prominent psychologists. In 1977, Donald Meichenbaum combined the theories of Jean Piaget's *Theory of Intelligence*, (1950), B. F. Skinner's *Theory of Behavior Modification*, (1953), and Albert Bandura's *Social Learning Theory* (1971) into a working model. Cognitive training includes modeling and self-instructional, self-monitoring techniques by means of private speech rehearsal (Armbruster, B. B.,1983). This instruction is based upon the interactive, reciprocal nature of the thoughts, feelings and behaviors of one's own thought processes (McDaniel, E. & Lawrence, C., 1990; Meichenbaum, D., 1977).

Suggestopedia (Lozanov, G., 1978).

Suggestopedia is an accelerated learning pedagogy for students in elementary school to adult learning. The comprehensive methodology using the principle of suggestion can be applied to any curriculum and be used at any grade level. The instruction was originally designed to intensively teach foreign languages (Alderson, J., 1993). Other applications include reading, math, and language instruction, typing, and high school science classes (Palmer, L., 1990).

Suggestopedic procedures include initial physical relaxation along with accelerative learning techniques which include memorization with rhythm and vocal intonation, role playing, guided imagery, and suggestive principles.

Simultaneous versus Sequential processing (Kaufman, A. & Kaufman, N.)

Simultaneous processing involves imagery, or wholistic gestalt specialization. Information is seen or heard as one entity. Sequential processing involves learning information step-wise, a foundational component of reading comprehension, spelling, mathematics, grammar, following oral directions, and instructional procedures. Paivio (1986) contended that the dual processing system of speaking (sequential processing) and nonverbal imagery (simultaneous processing) is the underlying foundation for memory and thinking. When combined into whole brain thinking, these two brain functions allow rapid learning to occur (Kaufman, A. & Kaufman, N., 1983).

In general, researchers have found that students often perform poorly on sequencing ability tests (Erland, J. K., 1989b; Kaufman, A. & Kaufman, N., 1983). Teachers echo this concern about their students' inability to follow in-class verbal directions (Baker, P., 1991), which usually are given in an auditory, step-by-step (sequential) format (Baker, H. & Leland, B., 1935, 1967).

This encoding-decoding and memory expansion bridge may be absent with traditional methods of teaching (see figure 1) (Erland, J. K., 1989a; Sternberg, R. J., 1985; Woodcock, R. J., 1978; Johnson, D. L. & Myklebust, H. R., 1967). With students' visual and listening memory levels remaining in a static position, encoding-decoding ability suffers (Kamhi, A. G. & Catts, H. W., 1989). Critical thinking does not result, and therefore test-taking ability does not improve.

Even if problem areas are identified through standardized testing, the question still remains, can cognitive deficiencies be addressed and remediated in the classroom? Will elevated cognitive skills generalize to improved academic proficiency in Reading?

figure 1

LEVEL OF PROCESSING	SUCCESSIVE	SIMULTANEOUS
Conceptual		
	DTLA #3 Oral Directions	DTLA #3 Oral Directions
Symbolic	WJ #10 Number Reversals	WJ #10 Number Reversals
	DTLA #11 Letter Sequences	DTLA #11 Letter Sequences
	WJ #3 Memory for Sentences	
Memory	DTLA #4 Word Series, Nouns	DTLA #4 Word Series, Nouns
		WJ #2 Spatial Relations
		WJ #7 Visual Matching
Perceptual		DTLA #10 Word Fragments

LA-2 = Detroit Tests of Learning Aptitude, Hammill, 1985
= Woodcock Johnson Psycho-Educational Cognitive Skills Battery,
Woodcock and Johnson, 1978, 1989

ed upon Johnson & Myklebust's information processing hierarchy theory (1967), and [illegible] from [illegible]ck's level of processing theory (1978).

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Method

Overview

This pre-post Quasi-Experimental study was implemented in a 5th grade public school classroom. A Control group was randomly selected from one of four of the teacher's previous academic years, teaching the same grade at the same school.

The instruction was conducted with teacher assisted video-taped- and audio-tape technology. Elements of simultaneous and sequential learning, encoding and decoding, modeling and self-monitoring were foundation components of the applied techniques. Cognitive skills tests were administered pre-post training for comparison with the district's nationally standardized academic achievement tests.

An intra-analysis of seven remedial and learning disabled students (RD/LD), within the class of 20 students, was also performed. These seven RD/LD students had qualified for special reading and learning disability programs according to state funding guidelines.

Subjects

Experimental Group. A fifth-grade class of 20 students (12 males and 8 females) from a low-to-middle income, small, midwestern farming community (pop. 15,200) was selected for the study. The teacher described this class as being typically average in ability with several learning and behavioral problems that were assigned to her because of her teaching experience. The mean Grade Equivalent at entry for the class was 5.58. Included in this class were seven RD/LD students. Their ages ranged from 10 to 12, with a mean age of 11.4. There were 18 Caucasian students and two Hispanics. Few of their parents had formal education beyond high school.

Control Group. Other SRA achievement test scores, of fifth-graders from the teacher's previous year's class at the same school, were available for further analysis by the district. The randomly selected Control group consisted of 18 fifth-grade students, including one learning disabled (LD) student. This single student could not establish comparative purposes of the RD/LDs in the Experimental group. The SRA mean Grade Equivalent at entry was 6.64.

The Control group received individualized cognitive testing. However, only ten of the eighteen students in the Home Base Class were available for the testing. Both pre- and post-cognitive skills tests were administered individually to each of the ten students.

A published report (Erland, J. K., 1989a) of 40 experimentals and 40 controls tested with the same cognitive tests, and implementing the training, revealed that no significant cognitive skills gains were made by the Control group. Since this earlier report had delineated cognitive gains with longitudinal benefits when the same training was applied in a small, private setting, it was suggested that cognitive skills gains may generalize to reading improvement in a classroom setting. Therefore, it was predicted that the Experimental training group's reading subtest scores on the Science Research Associates Standardized Achievement Testing (SRA, 1985) would exhibit greater gains than the Control group.

Learning/Reading Disabled Group. A set of seven Reading (RD) and Learning Disabled (LD) students was intra-analyzed. This set included four males and three females, all Anglo-Saxon. The mean age for the seven students was 11.7 years. None had repeated grades, and all had received remedial services for two previous years.

Materials/Instruments Used, The Mental Foundation Requirements:

Focus cognitive areas were:

Visual sequential memory (Meeker, M. N., 1991, 1969; Hessler, G., 1982; Reid, D. K. & Hresko, W. P., 1981).

Auditory sequential memory (Meeker, M. N., 1991, 1969; Hessler, G., 1982; Reid, D. K. & Hresko, W. P., 1981).

Visual and auditory closure for details (Kamhi, A. G. & Catts, H. W., 1989; Hammill, D. D., 1985).

Symbolic and figural content (Meeker, M. N., 1991, 1969; Rumelhart, D. E. & McClelland, J., 1986).

Auditory and visual memory for words (Hammill, D. D., 1985; Kirk, S. A. & Chalfant, J. C., 1984).

Classifying information (Meeker, M. N., 1991, 1969; Kamhi, A. G. & Catts, H. W., 1989; Sternberg, R. J., 1985).

Encoding and decoding information (Kamhi, A. G. & Catts, H. W., 1989; Sternberg, R. J., 1985).

Spatial and directionality skills (Gardner, H., 1993; Meeker, M. N., 1991, 1969; Hessler, G., 1982; Hammill, D. D., 1985).

Cognitive Tests. Several standardized cognitive subtests from two different batteries were selected on the basis of their reliabilities, and Woodcock's 1978 Hierarchy Theory (see Figure 1), to measure each student's abilities (Hessler, G., 1982; Woodcock, R. W., 1978). Four subtests were selected from the DTLA-2 (Hammill, D. D., 1985), and four subtests were chosen from the Woodcock Johnson Psycho-Educational Battery-1 (Woodcock, R. W. & Johnson, M. B., 1977). These instruments were designed to measure perceptual processing in visual and auditory sequential memory and visual simultaneous memory (Kaufman, A. & Kaufman, N., 1983; Hessler, G., 1982).

Five subtests were selected to measure *successive processing*, and three subtests were selected to measure *simultaneous processing* (Kaufman, A. & Kaufman, N., 1983; Hessler, G., 1982; Woodcock, R. W., 1978).

The five subtests measuring *successive processing* were: DTLA-2 No. 4 (Memory For Unrelated Word Sequences); WDJ No. 3 (Auditory Memory For Sentences); WDJ No. 10 Number Reversals); DTLA-2 No. 11 (Memory For Letter Sequences); and DTLA-2 No. 3 (Following Oral Directions).

The three subtests measuring *simultaneous processing* were: DTLA-2 No. 10 (Visual Closure Word Fragments); WDJ No. 7 (Visual Speed Number Match); and WDJ No. 2 (Visual Memory For Spatial Designs).

The WDJ *simultaneous processing* subtests No. 2 & No. 7, and the *successive processing* subtests No. 3 & No. 10 are computed in clusters of two subtests each. Therefore, the eight subsets are reported as six.

At the conclusion of the twelve-week treatment period, the same cognitive tests were re-administered to the students. Post-testing procedures identical to the pre-treatment testing were administered and evaluated by the investigator who had a Masters Degree in Special Education, and qualified in assessment and evaluation. All of the eight subtests were administered individually.

Woodcock-Johnson Psycho-Educational Battery (1977, 1978), Cognitive tests Part I, based upon Woodcock's Level of Processing, 1978 (see Figure 1).

Two Subtest Clusters:

2 &7 (Visual Speed) Reliability .91, with over 4000 subjects,

3 & 10 (Auditory Memory). Reliability .90 with over 4000 subjects.

The Detroit Tests of Learning Aptitude-2, Hammill 1985, subtests for ages 16/17:

	Reliability	Validity
3 (Oral Dir.)	.86	.74
4 (Unrel. Words)	.90	.66
10 (Wd. Fragments)	.97	.53
11 (Letter Seq.)	.92	.63

Achievement Tests. To obtain an academic achievement comparison with the cognitive testing, pre- and post-treatment scores on the standardized Science Research Associates tests (SRA, 1985) were analyzed. The subtests included Reading, Language Arts, Math, Science, Reference Materials and Social Studies.

At the end of the previous grade (fourth), each child received routine SRA testing, which served as the pre-test. At the conclusion of fifth grade and the twelve weeks of training, the SRA achievement tests were re-administered to serve as post-test comparisons. The classroom teacher administered these achievement tests, which then were scored and interpreted by the SRA company.

Other Materials Used

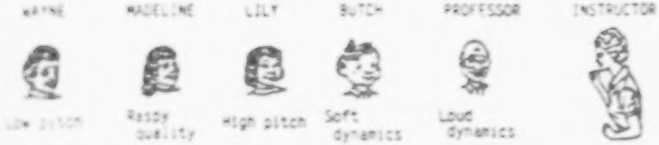
Workbook Lessons. Each student received a copy of the Mem-ExSpan's *The Bridge To Achievement (BTA)* (Erland, J. K., 1994, 1991, 1988, 1986, 1985, 1981) lesson for each day and a personal folder for daily work. *The Bridge To Achievement* implements simultaneous and sequential instruction directed at training J. P. Guilford's (1967) primary cognitive abilities. The teacher implemented video and audio tapes corresponding to the workbook lessons in teaching the daily assignments.

Stimulus figures. Life-size wooden puppets were video- and audio-taped as models for the teaching lesson. This teaching tool was within a Suggestopedic design framework (Lozanov, G., 1978). Three male and two female models, in varying age ranges, and speaking with a variety of vocal qualities, were featured for the students (Erland, J. K., 1989c).

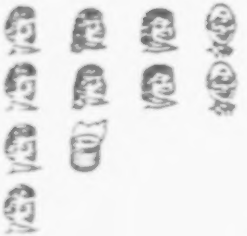
The use of celebrity voice-overs for practice and drill was explained. For this modeling process, the students selected their own specific identities from celebrity film, athletic, and media star options (Hall, V., 1983; Bandura, A., 1971). The life-sized videoed characters were introduced (see Fig. 2) and each was identified with a celebrity. The student maintained the celebrity association throughout the rehearsal instruction (Bandura, A., 1971).

figure 2

These characters do the speaking in each lesson:


WAYNE
MADELINE
LILY
BUTCH
PROFESSOR
INSTRUCTOR
Low pitch
Raspy quality
High pitch
Soft dynamics
Loud dynamics

TYPICAL CHARACTER REPETITION ORDER



- repetition 1 (Wayne, Madeline, Lily, Professor)
- repetition 2 (Wayne, Madeline, Lily, Professor)
- repetition 3 (Wayne, drum)
- repetition 4 (Wayne)

- repetition 1 (individual) (Wayne, Madeline, Lily, Butch)
- repetition 2 [illegible] (Wayne, Professor)
- repetition 3 (solo) (Professor)
- repetition 4 (solo) (Professor)

- question 1 (Madeline)
- question 2 (Wayne)
- question 3 (Lily)

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The students were to imitate and recite with the characters while pretending they were actors auditioning for parts in television commercials. Reciting in a variety of voices ranging from low, to squeaky and high created interest in the lesson and memory rehearsal process (Erland, J. K., 1992). Like television viewing, the training added an entertainment factor to the lessons (Postman, N., 1985).

The life-size videotaped figures were used as class models for the following reasons:

1. The variety of vocal intonation including pitch variations, tonal changes and sound dynamics in the characters' voices was designed to enhance visual and auditory memory (Gilmor, T., Madaule, L. P. & Thompson, B., 1988; Render, G. F. & Anderson, L. D., 1986; Lozanov, G., 1978).

2. The lineup of faces chunked, in sequence, the bits of information to be learned. The video screen featured one large face at a time. Each face depicted and recited a chunk of information. Thus, the continuous rehearsal rotations of the various faces produced sequential analytical skills instruction (Erland, J. K., 1989a). This format created a recursive, rehearsal paradigm (Hofstadter, D. F., 1989; Erland, J. K., 1980).

The characters became an important tool in portraying both simultaneous components and analytical sequence components (Erland, J. K., 1989a), thus creating a simultaneous - sequential partnership teaching method (Kaufman, A. & Kaufman, N., 1983). The shift between the two systems were designed to form visual and auditory integration, the basis for comprehension ability (Kamhi, A. G. & Catts, H. W., 1989; Rumelhart, D. E. & McClelland, J. L., 1986).

3. The animated, vocal characters were non human, non authorative figures which were implemented to reduce the stress surrounding the intensive rehearsal procedures. They were given celebrity identities (Bandura, A., 1971) to heighten the emotional arousal, motivation and attention of the learner. Suggestopedia demonstrates that learning is accelerated under this condition (Lozanov, G., 1978).

4. Because of their designed celebrity identities, the characters qualified as motivating models (Hall, V., 1983; Bandura, A., 1971).

5. The figures created a point of focus, attention and concentration, all which are requirements of Social Learning Theory (Kaplan, J. S., 1991; Bandura, A., 1971). The unusual faces formed a gestalt framework on the video screen and became a simultaneous memory aspect (Erland, J. K., 1989a).

6. Because they were non human wooden characters, the possibility of distracting facial movements or expressions was eliminated. The large staring eyes were a focal point, riveting student attention (Jaynes, J., 1982). Only the mouths of the figures moved with syllabized speech. The large solid videoed figures were implemented to improve visual closure, which is visual processing in a whole-pattern formation (Paivio, A., 1986; Kirk, S. A. & Chalfant, J. C., 1984), a fundamental requirement for reading (Kamhi, A. G. & Catts, H. W., 1989; Coles, G., 1987).

7. The videoed celebrity character identity format was selected as part of the suggestopedic design to create a warm, close, stimulating environment conducive to learning and memory training (Erland, J. K., l992; Cormier, S., 1986; Schuster, D. H. & Gritton, C. E., 1986; Lozanov, G., 1978).

Video-Taped Recordings.

Video-taped recordings of the lessons using the character impersonators were played for the class-training exercises. The various wooden faces, acting in a progressive format, modeled the exercise segments. Each character impersonator was filmed separately in succession (Erland, J. K., 1992, 1989a).

Therefore, as the figures recited individually in rotation, the learning segment cycled both vocally and visually. This cycling process formed a "strange loop phenomenon," which is an undercurrent theme found in art, mathematical formulae, nature and musical leitmotif paradigms (Hofstadter, D. F., 1989). It is referred to as "strange" because when the process appears to end (like changing seasons, moon phases), it begins cycling over again in a recursive mirroring pattern.

The character impersonators formed several varying rehearsal formats. The videoed action included several formats that were tailored to the lesson context and content. There were three primary rehearsal formats, (see figure 2) and an additional twelve secondary formats using different combinations of characters. (Erland, J. K., 1989c).

Audio Tape Recordings.

The same lessons and formats had accompanying audio tapes for auxiliary classroom use. The letter sequence warm-ups (Rumelhart, D. E. & McClelland, J. L, 1986), and the Latin root cool-downs (Gardner, H., 1993b; Sternberg, R. J., 1985; Devine, T. G., 1982) were implemented with audio tape instruction.

Academic Content

The video and audio tapes included sequenced instruction from *The Bridge To Achievement* (Mem-ExSpan, 1981, 1985, 1986, 1988) in the following areas:

Sight words and reading comprehension (Deschant, E. V. 1991; Cairney, T., 1990; Kamhi, A. G. & Catts, H. W., 1989; Just, M. & Carpenter, P. A., 1987; Rumelhart, D. E., & McClelland, J. L., 1986; Armbruster, B. B., 1983).

Spelling words and non related letter sequences (Deschant, E. V., 1991; Downing, P., Lima, S. & Noonan, M., 1992; Rumelhart, D. E., & McClelland, J. L., 1986).

Vocabulary and Latin root words (Gardner, H., 1993b; Sternberg, R. J., 1985; Devine, T., 1982).

Math computation (Gardner, H. 1993b; Sternberg, R. J., 1985; Kline, M., 1985; Reid, D. K., & Hresko, W. P., 1981).

Grammar and syntax (Kess, J. F., 1992; Kamhi & Catts, 1989; Goodman, K. 1987).

Numerical digit spans (Kline, M., 1985; Hessler, 1982; Woodcock, 1978).

Following oral directions (Simpson, Greg B.,1991; Hammill, 1985; Erway, E. A., 1984; Devine, T. E., 1982).

Following figural sequences (Jackendoff, R. S.,1992; Schiffer, S. & Steele, S.,1988; Meeker, 1991, 1969).

Following symbolic sequences (Hoffman, R. R. & Palermo, D. S., 1991; Dinsmore, J., 1991; Meeker, M., 1991, 1969).

Spatial and directionality skills (Meeker, M., 1991, 1969; Margolis, H., 1987; Hessler, 1982).

Poetry repetition (Gardner, H., 1993; Simpson, G. B., 1991; Hessler, 1982; Hammill, 1985).

Training Schedule.

The students used *The Bridge To Achievement* (Erland, J. K., 1994, 1989, 1988, 1986, 1985, 1981) Lessons 2-40 for twelve weeks of one semester. The spring semester was selected to maintain program continuity because there were fewer holiday interruptions.

The students were scheduled to train during the first 30 minutes of the morning, four times weekly. This constituted two hours of training per week for twelve weeks, or a total of 24 hours. The training was performed in the home room class at the time the teacher normally took daily roll and lunch collections. This was found to be an effective time to apply memory and higher-order thinking skills training.

The mental stimulation was designed to accelerate the learning process for the remainder of the day. Suggestopedic physical and mental relaxation techniques (Lozanov, G., 1978) were not applied in this training. Not only were there time constraints, but the emphasis was to activate, stimulate and engage the learner with the early morning mental stimulation training.

Training Procedures

The study was designed to minimize teacher instruction and initial teacher training. The teacher implemented the exercises using the instructional manual, auditory and video tapes. The teacher's role was to maintain classroom discipline and structure, introduce each lesson with its procedures, lead the self-affirmations, and then teach the higher-order thinking skills lessons (Erland, J. K., 1994).

Students were seated with their desks continuously touching in four horizontal parallel rows facing the video monitor. Based upon the individualized pre-training cognitive testing, and unbeknownst to them, students were paired high and low visual, high and low auditory.

Before beginning the work session, the entire group recited two self-affirmations, which are positive statements designed to motivate and encourage participatory learning for each individual student (Bower, G., 1987; Meichenbaum, D., 1977). Examples of the statements are: "Learning is fun," "I believe in myself and my abilities," "I like to work hard," and "I feel good when my work is done."

The students were encouraged to show positive enthusiasm and support for one another as motivating and attentional factors (Schuster, D. H. & Gritton, C. E., 1986; Bandura, A., 1971) that increase the retention of learned material. Discipline and structure were maintained throughout each lesson. The students maintained rapt attention with no visiting among themselves.

Following the self-affirmations, each daily training session began with two five-minute "Warm-Up" lessons. The exercises were designed to incorporate various visual and auditory processing skills that influence word recognition (Kamhi, A. G. & Catts, H. W., 1989; Rumelhart, D. E. & McClelland, J. L., 1986).

On Monday and Tuesday the regular class-room group warmed up with two unrelated letter-span sequences (Coles, G., 1987; Rumelhart, D. E. & McClelland, J. L., 1986) and two encoding-decoding flips (Baddeley, A. D., 1993; Kamhi, A. G. & Catts, H. W., 1989; Sternberg, R. J., 1985).

On Wednesday and Thursday warm-ups were two number-span recitations (Gardner, H., 1993b; Kline, M., 1985; Hessler, G., 1982) and two unrelated word series recitations (Hammill, D. D., 1985; Kaufman, A. & Kaufman, N., 1983; Hessler, G., 1982). A similar procedure was followed each day in the special reading classroom group with the exception of Thursday, when teaching was not conducted.

Drill and Practice Defined: Traditionally, drill and practice are repeated output trials by the student. They form rote learning through speaking or writing. In former years, students routinely learned spelling words and math facts through rote drill. With *Patterns and Systems Training*, the output trials are created by the puppet models on video tape, and are treated as the rehearsal practice of mental encoding-decoding games.

The daily lessons gradually progressed in complexity during the course of the training (Sulzar-Azaroff, B., 1991; Decker, P. J., 1985). The information chunking procedure began with a series of three items and progressed to ten items (Miller, G. A., 1981, 1956). The students began by rehearsing three unrelated items within the categories of letters, colors, numbers and words, reciting with the video-taped character models. By the end of the twelve-week semester, the students were rehearsing strings of ten items in varying chunked formations (Erland, J. K., 1989c). The objective was to enhance their encoding and decoding processes (Sternberg, R. J., 1985), and their ability to follow complicated stepwise procedures through memory strengthening (Baddeley, A. D., 1986; Kamhi, A. G. & Catts, H. W., 1984; Howard, D., 1983).

The exercise drills were specifically designed to switch back and forth between simultaneous and successive processing (Kaufman, A. & Kaufman, N., 1983; Hessler, G., 1982). The purpose was to encompass the entire thinking process and to include all cognitive thinking abilities (Guilford, J. P., 1967). Therefore, students favoring one style of processing over the other (Dunn, R., Dunn, K. & Price, G. E., 1987) soon became engaged in, and were comfortable with, both cognitive styles. Each drill included several sequential properties and several simultaneous properties (Kaufman, A. & Kaufman, N., 1983). This was to activate a synergistic mental cognitive shift (Coles, G., 1987), creating multisensory integration (Struppler, A. & Weindl, A. W., 1987; Clark, B., 1986; Reid, D. K. & Hresko, W. P., 1981; Woodcock, R. W., 1978). If an individual can integrate information across modalities, academic skills are

figure 3

CONTENT TITLE: Series of Unrelated Words   MATERIALS NEEDED: Instruction Sheets

OBJECTIVE: To remember facts and names   MEMORY RETAINER LESSON: 6, 7, 8

Repetition #	Directions	Time	Purpose And Modality To Improve	T V Mode	Brain Hemisphere
1.	Read series in the manual.	8 Min.	Visual-Sequential Memory		RB-LB
2.	Look at T.V. sequence. Lightly repeat overtly.		Overall Gestalt (faces). Speech-language Area Synthesis Encoding Visualization	Parts	RB-LB
3.	Focus on segments, memorizing each component. Repeat covertly.		Analysis Decode Auditory-visual	Parts	RB-LB
4.	Covertly repeat, absorbing rhythmic beat of segments. Pull into a whole.		Synthesis Auditory-verbal memory	Single Wayne drum	RB
5.	Repeat covertly entire sentence.		Analysis Auditory-sequential memory	Single Wayne alone	LB
6.	Independently repeat sequence.		Synthesis Auditory-sequential memory	T.V. on pause	LB
7.	When all of the members of the groups have recited, all students simultaneously write down on paper the sequence from memory forward, reverse, and forward.		Visual-Motor Integration, Visual Sequential Memory, Visual Closure, Encoding-Decoding		LB-RB

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figure 4

Memory Retainer Lesson #7

Series of Unrelated Words - Advanced Level

Series of 6 Unrelated Words

1. sky, mode, control, system, one, the
2. prevent, camera, man, extreme, bellows, hello
3. which, need, photograph, probably, can't, its
4. impulse, injure, helped, quiet, value, mental
5. causes, life, annoyance, strain, irritability, feeling
6. percentage, residents, affected, age, intensity, risk
8. select, exposure achieve, most, automatic, why
9. surrounding, police, confederate, problems, amount, demonstrate
10. stereotype, others, themselves, plenty, molasses, zeal
11. human, meat, Eskimo, way, oysters, casual
12. bread, incredible, feats, fueled, reminded, health
13. intrigued, implications, behavior, fast-food, press, went
14. surpass, species, individuals, plenty, environment, message
15. experiments, gourmet, vegetarian, characterize, only, not
16. formation, observers, should, appropriate, prefer, add
17. as, scuba, tennis, thus, admitted, feeling
18. helped, impeccable, railed, bin, selects, smooth
19. doctors, months, and, awkward, pleasant, doesn't
20. purchase, natural, potential, told, thousands, supreme

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improved (Kamhi, A. G. & Catts, H. W., 1989; Reid, D. K. & Hresko, W. P., 1981).

A video-taped face and accompanying voice represented each segment of the exercise (Erland, J. K., 1992, 1989a). The students in unison recited with each video character segment, gradually and systematically memorizing the sequence. They repeated the recitations using the celebrity voices, as self-talk rehearsal is a CBM guideline (Sulzar-Azaroff, B., 1991; Meichenbaum, D., 1977).

This design was to increase memory span capacity and resilience (Baddeley, A. D., 1993; Howard, D., 1983). As the segments increased in length, the students automatically incorporated the additional information. Both video and auditory tapes were used for the instruction. The sequential video or auditory taped action became an exercise of mentally chunking a sequence of cycling patterns (Erland, J. K., 1989c; Simon, H. A., 1979, 1974).

First, the students orally read each line in unison without the tape. The purpose of this initial rehearsal was to review the overall content of the information.

Next, the video or audio tape was turned on. Three characters alternately spoke to signify each cluster. The students recited the sequence twice with the rotating clusters.

The student recitations were spoken slowly and deliberately to match the vocal intonations (Lozanov, G., 1978) of the video taped characters.

The entire sequence was then repeated a third time chorally, with one of the characters singing in a low voice and striking a drum at the beginning of each cluster. The drum beat was designed to accentuate each chunk and activate auditory closure (Erland, J. K., 1989a; Kirk, S. A. & Chalfant, J. C., 1984). This procedure synthesized the chunked patterns and formed a right brain gestalt (Paivio, A., 1986). Then the sequence was repeated a fourth time chorally, by the same low-voiced character without the drum beat (Erland, J. K., 1989a). This completed the synthesis of the information.

The video or audiotape then was placed on pause. The students quickly wrote the correct sequence on paper and repeated the sequence covertly to themselves in accordance with the self-monitoring of Cognitive Behavior Modification methodology (Decker, P. J., 1985; Meichenbaum, D., 1977).

After the students checked their work for accuracy, the video or audio tape action resumed with playing of the next speaking segment. The students rehearsed the line a total of four times, using the chunked analysis and synthesis rotation system (Erland, J. K., 1992, 1989a).

Summary of the first of three primary rehearsal formats (see Figures 2 & 3):

1. Read an item for an overview.
2. Recite in parts (3 vocal intonations).
3. Recite in parts (same 3 vocal intonations).
4. Recite with low voice and drum.
5. Recite with low voice alone.
6. Write down the answer while reciting covertly.

The daily lesson closed with audio-tape "Cool-Down" exercises which included the recitation of two or three Latin root words, their meanings and their derivatives (Gardner, H., 1991; Sternberg, R. J., 1985; Devine, T. G., 1982). The following day, the mental exercise system began with two video- or audio-tape "Warm-Up" items in the categories of (numbers, words, letters and coding flips) (Sternberg, R. J., 1985) and twenty minutes of the next pattern and sequence lesson. The lesson concluded with Latin root word "Cool-Down" drills.

Results

Since the design of the training exercises included the foundation cognitive skills components of reading (Kamhi, A. G. & Catts, H. W., 1989), and previously published positive results of the training (Erland, J. K., 1989a), significant gains on the SRA (1985) *Reading* subtest were predicted.

This Quasi-Experimental design analyzed SRA test scores with fifth grade students as the Experimental group. The teacher's previous years' SRA 5th grade class data, was randomly selected from one of her four previous teaching years, (all classes were taught in the same classroom at the same school) to serve as the Control group.

Cognitive Skills

It was hypothesized that students who received the video-analytic skills training would evidence greater cognitive skills improvement than students who did not receive such training. To test this hypothesis, separate ANCOVAs were calculated, based on raw scores, for DTLA-2 No. 4 (Memory for Unrelated Word Sequences), DTLA-2 No. 3 (Following Oral Directions), DTLA-2 No. 11 (Memory for Letter Sequences), DTLA-2 No. 10 (Visual Memory for Spatial Designs) WDJ No. 2 (Visual Memory for

Spatial Designs), and WDJ No. 7 (Visual Speed Number Match), WDJ No. 3 (Auditory Memory for Sentences), and WDJ No. 10 (Number Reversals) (Hammill, D. D., 1985, Woodcock, R. W. & Johnson, M. B., 1977). See figure 1, for the names of these tests, and why they were selected to measure Simultaneous and Successive Processing.

Results appear in Table 1.

Consistent with predictions, Experimental video-training students evidenced greater improvement than did Control students on all cognitive skills tests: F's ranged from 4.47, $p < .05$, for DTLA-2 No. 4, to 68.69 for DTLA-2 No. 3, $p < .001$ (all ANCOVAs with 1 and 27 df). Similar results were obtained, even with the correspondingly smaller samples, when normal and Special Needs students' gains were separately analyzed, with the exception that DTLA-2 No. 4 for both groups, and WDJ Nos. 7 and 10 for the Special Needs students no longer reached the .05 level of significance.

Table 1. Pre-test and Post-test Raw Scores of Controls (No Training) and Experimentals (Video-training) Groups on Cognitive Skills Tests

		Controls (n = 10)				*Experimentals (n = 20)*			
		Pretest		Posttest		Pretest		Posttest	
Test	Max	M	SD	M	SD	M	SD	M	SD
Simultaneous Processing Tests									
DTLA 10	(39)	25.90	4.10	27.10	3.64	21.95	8.04	29.35 *	4.89
WDJ 2	(74)	41.60	4.81	41.60	4.48	41.50	5.24	49.85 @	6.65
WDJ 7	(30)	19.10	2.96	20.50	4.04	18.60	2.72	22.95 +	2.61
Successive Processing Tests									
DTLA 3	(55)	38.30	5.52	39.50	4.35	42.40	6.26	52.10 @	3.31
DTLA 4	(30)	13.70	5.17	16.40	7.63	12.45	5.06	17.50 +	4.86
DTLA 11	(67)	39.60	9.81	38.80	10.86	53.60	7.37	64.30 @	5.91
WDJ 3	(30)	14.80	3.91	15.20	2.97	11.90	2.25	15.35 @	2.50
WDJ 10	(21)	7.10	2.92	8.30	2.63	7.95	3.61	11.50 @	2.89

Note: $N = 30$.; + $p < .05$; * $p < .01$. @ $p < .001$ Significantly different mean gains are based on ANCOVA results with 1 and 27 degrees of freedom.

Academic Skills

It was hypothesized that students who received video-taped *Patterns and Systems Training* would evidence greater reading improvement than students who did not receive such training. To test this hypothesis, students' pretest and posttest percentile scores on the SRA (1985) achievement tests were first converted to standardized, normal curve equivalents (M = 100, SD = 15), then separate ANCOVAs were calculated for Reading, Mathematics, Language Arts, Social Studies, Science and Reference Skills. Results appear in Table 2. Consistent with the prediction, video-training students evidenced greater reading improvement than did no-training students, F (1, 35) = 10.16, p < .003 (Grade Equivalent, or GE, gains were 3.76 and 1.76 years, respectively).

Table 2. Pre- and Posttest Standard Scores of Control and Experimental Groups on SRA Achievement Tests

	Controls (n=18)				Experimentals (n=20)			
	Pre-test		Post-test		Pre-test		Post-test	
Test	M	SD	M	SD	M	SD	M	SD
R	106.78	9.33	108.06	9.69	99.70	9.41	110.45*	13.79
M	109.67	11.49	106.94	10.25	103.00	8.97	111.95*	15.26
LA	104.17	9.28	108.17	13.07	100.55	8.15	103.55	7.30
So+	105.22	9.86	104.00	7.30	100.58	7.59	104.26	7.49
Sc+	105.22	9.17	104.50	8.73	102.53	12.74	102.53	6.79
RS+	107.11	10.76	105.56	6.67	104.79	6.90	104.58	4.65

Note: N = 38, except where + denotes N = 37. *: p< .001; df = 1,35 (or +: 34).
R = Reading Composite, M = Math Composite, LA = Language Arts Composite,
So = Social Studies Composite, Sc = Science Composite, RS = Reference Skills

Although not predicted, a similar pattern was also evident for Mathematics, F(1, 35) = 18.24, p < .001 (GE gains were 3.22 and .95 years, respectively). Between-group differences for Language Arts, Social Studies, Science and Reference Skills did not approach significance.

Because video-training Experimental students' pretest Reading scores were significantly lower than those of no-training Control students, t (36) = 2.32, p < .03, it could be argued that the greater gain of the former was due, at least in part, to regression toward the mean. Two lines of evidence argue against this interpretation, however. First, following a procedure recommended by Oldham (1962) to control for significant preexisting differences, an ANCOVA was computed on Reading scores using the average of pretest and posttest scores, i.e., (pretest + posttest)/2, as the covariate. The between-group difference remained significant, F (1, 35) = 16.19, p < .001.

Second, the lower pretest Reading scores in the video-training versus the no-training group could be due to the greater number of Special Needs students in the former than in the latter (7 versus 1). If this reasoning is correct, then removal of Special Needs students should approximately equate the groups on pretest Reading scores, while the posttest difference should remain significant. Results supported this analysis: When Special Needs students were removed, mean pretest Reading scores for normal students in the Experimental and Control groups no longer significantly differed (standard score pretest M's = 104.69 and 107.35, respectively), t < 1. ANCOVA results remained significant, however, F (1, 27) = 7.40, p < .01 (standard score posttest M's = 115.54 and 108.94, respectively).

In contrast, pre-test Reading scores of Special Needs students in the Experimental group averaged significantly lower than those of normal students in the Control group, t (22) = 4.18, p < .001 (standard score M's = 90.43 and 107.35, respectively). Although the average Reading gain made by the former roughly paralleled that made by normal Experimental students (GE gains were 3.09 and 4.12 years, respectively), this gain did not significantly differ from that of the Control group normals (GE gain = 4.12 years), F (1, 21) = 1.67, p > .20 (standard score posttest M's = 101.00 and 108.94, respectively).

Table 4 shows a comparison in Grade Equivalent (GE) gains of the Special Needs students with the Experimental and Control groups. The Special Needs students' improvement exceeded that made by the Control group.

Interestingly, the standard score gains in Reading and Mathematics for the entire Experimental group were strongly correlated, $r\ (18) = .67$, $p < .001$, whereas this correlation was not significant in the no-treatment group, $r\ (16) = .38$, $p > .10$. Although not predicted, this finding is entirely consistent with the suggestion that the shared variance of Reading and Mathematics gains in the former was due to a common cause, i.e., to the video-taped *Patterns and Systems Training*.

One might question the validity of using a randomly selected intact class, from one of the teacher's four previous teaching years, as a Control group. Individual scores from this class on the SRA tests were available.

Composite scores of the teacher's previous four years of teaching fifth grade were available, and Grade Equivalent (GE) Means were tabulated for the subtest scores. Table 3 shows a comparison of the Grade Equivalent Means of the various subtests. This would serve as an indicator for comparison between the teacher's Mean scores and the scores obtained in this study. This would give an indication as to whether there were gains beyond what she routinely achieves.

Table 3 represents the four-year (GE) post-test average, as well as the Experimental group's post-test average, on the respective SRA achievement tests. As can be seen, while the post-test averages for Language Arts, Social Studies, Science or Reference Skills do not differ (-.1, 0, -.1, and .1 years, respectively). However, the Reading and Mathematics averages, the two tests on which substantial gains by the Experimental group were evident, do differ (1.5 and 1.4 years, respectively). Thus, while not definitively solving the intact-group problem, this pattern of findings certainly suggests that the Control group used in this study was representative of prior classes, and was therefore a viable baseline against which gains due to video-taped *Patterns and Systems Training* could be compared.

Table 3. SRA Grade Equivalent Mean Scores of Previous Years and Present Study Experimentals

A. All Data Averages	Composite	Reading	Lang.	Math	Refer.	Soc.St.	Science	IQ
Previous four years	7.5*	7.5*	8.0	7.4*	7.9	7.5	7.0	106
Experimentals (n=20)	8.7*	9.0*	7.9	8.8*	8.0	7.5	6.9	111

* Significant academic variance

B. Selected Data with Comparable Pretest Scores
(Grade Equivalent G.E. = 6.6 or higher)

Reading (overall)	G.E. Mean	Post G.E. Mean	Mean Gain
Experimentals (n=5)	7.32	12.04	4.72
Controls (n=18)	6.76	8.42	1.66

Math (overall)	Pre G.E. Mean	Post G.E. Mean	Mean Gain
Experimentals (n=7)	7.19	11.74	4.55
Controls (n=18)	6.82	7.77	0.95

Table 4. Grade Equivalent Gains in Years for Experimentals and Controls without Training

	13 Experimentals	18 Controls	7 RD/LD Experimentals
Composite	3.90 years	1.79 years	2.07 years
Reading	4.12 years	1.66 years	3.09 years
Math	4.09 years	.95 years	1.59 years
Soc Studies	2.52 years	1.10 years	1.47 years

Note.: Training *n* = 13 except for for Social Studies, *n* = 12 . No training *n* = 17. All significance tests are 2-tailed.

Discussion

Pre- and posttests in cognitive skills were administered before and following the treatment. *The Patterns and Systems Training* was designed to teach analytical sequenc-ing and pattern detection skills, to raise Reading scores. The Results indicate that *The Patterns and Systems Training* resulted in increased academic scores in both Reading and Math, as measured on the Scientific Research Associates (SRA) standardized tests. The other four academic subtests remained flat. Although it was hypothesized that scores in Reading would improve, the improved Math scores came as a surprise.

Enhanced cognitive skills gains were achieved, as indicated by the results of the Experimental and Control Groups reported in Table 1. The cognitive skills data in the present study are further reinforced by the substantial academic gains made by the training group (three to four years for Reading and Mathematics, for example). These were the largest gains reported for any class in the school district that academic year, and were approximately twice those routinely obtained by the same teacher, with fifteen years of experience, in her prior 5th grade classes (see Table 3).

In a previous study, Erland (1989a) reported that a former Control group of 40 subjects evidenced 9-11 points of improvement in auditory and visual memory, whereas the improvement made by the 40 Experimentals ranged from 22-38 points. Substantial cognitive gains were also obtained in three other cognitive skill areas. Most notable was the improvement for the 40 Experimentals in the Following Oral Directions subtest, or integrating visual with auditory information (Ross-Swain, D., 1992; Beyer, B. K., 1987). The Experimentals, including 15 Reading and Learning Disabled, (RD/LDs) obtained 15.67 points improvement on this subtest versus the 2.67 points improvement by the Controls (which also included 15 RD/LDs).

It could be suggested that the novelty effect created student motivation and affected these reading and math achievement gains. The observed gains in cognitive skills improvement in training-group students can be arguably attributed to the extra attention, the novel elements introduced, and change from the routine the cognitive skills training offered, rather than to any unique aspects of the video/audio exercises which incorporated Cognitive Behavior Modification (Meichenbaum, D., 1977) and Suggestopedia principles (Lozanov, G., 1978).

Motivation and attitudinal change cannot readily account for selective gains on the

SRA subtests, however. If only motivation was involved, one would have expected large gains similar to those found for reading and mathematics in the other subtests of language arts, science, and reference materials. The two-year gains in language arts and spelling, and the less than one year gain in science, obtained in the present study, were consistent with the teacher's prior experience.

This does not suggest eventual larger gains in these latter areas are not possible, however. *The Patterns and Systems Training* in learning sequences and pattern detection appears to affect both reading and math positively. It must be explored whether more than one training session, taught in successive years, would increase academic performance beyond the normal one year growth expectancy in the other tested areas as well.

It seems reasonable that progressive implementation of cognitive skills training over a one- to two-year period would allow the substantial improvements in reading and mathematics to generalize to subject areas in which these skills are foundational. Cognitive retraining may need to focus on obtaining gains in the basic skills areas of math and reading during the first instructional year. Then, after this initial cognitive retraining implementation, the second year can focus on achieving higher gains in science and language arts. Since *The Bridge To Achievement* Spelling program (Erland, J. K., 1994) was not implemented due to time constraints, it can be speculated how the addition of the Spelling component would affect the Language Arts subtest on the standardized achievement test.

Information processing is the foundation for the ability to learn (Sternberg, R. J., 1985). Cognitive retraining is necessary to expedite learning at all ages. Therefore, it becomes critical to schedule training into the daily curriculum. Although cognitive and higher-order thinking skills training (Ruggerio, V., 1988b) fits well into Whole Language curricula, administrators and textbook companies nevertheless wonder where this training will fit into the daily schedule. A consideration is to offer cognitive retraining equally with musical, art, sporting activities, and social events. With the United States' low ranking among other countries in literacy skills, adequate time frames may have to be made available (Fortune Magazine, September, 1990).

The Learning Disabled students (LDs) in the training group made gains that suggest they can raise their reading and math achievement to a competitive level with average students. Although they did not make the large gains in math that the normal students obtained, the 1 1/2 years G.E. achievement gains made by the LD's are important, and they should not be minimized. It appears cognitive skills training for Learning Disabled students led to comparable, if not greater, achievement test performance on the composite, reading and math than that of normals who received no such training. For reading performance, the RD/LDs exhibited more than one additional year of reading improvement over the controls. This raises very low functioning students in reading and math into an average functioning mode. The cognitive strategies might have been a contributing factor to not only their actual reading ability, but also their overall learning and information processing capability.

This study indicated that an intensive rehearsal format to enhance memory and higher order thinking skills using educational technology can affect both high and low ability learners positively. This suggests that cognitive skills training through video technology is a plausible medium for helping both RD/LD and normal students become more academically competitive. Additional research to further analyze the motivational and learning effects of various types of video instruction is needed.

A published report (Erland, 1989a) indicated that on subtest #18, "Following Oral Directions", on the Detroit Tests of Learning Aptitude (DTLA-1) (Baker & Leland, 1935, 1967), eighty students prior to the study were able to perform less than half of the sequential items correctly. Forty student experimentals and another set of forty student controls scored an average of 14-17 points out of 40. Following analytical skills training in a small group (3-5) private setting, the 40 experimentals improved their ability to follow directions with a mean of 30 out of 40 points, an improvement of 14 points. In contrast, the controls scored 18 points out of 40, or an improvement of 1-2 points. This study indicated that *Patterns and Systems Training* can be helpful in improving individuals' ability to perform stepwise procedures in math, science and computer skills (Erland, J. K., 1989a).

Patterns and Systems Training is directed at intersensory integration of visual, auditory, tactile, and kinesthetic modalities (Struppler, A. & Weindl, A. W., 1987; Hessler, G., 1982; Bandura, A., 1971) by learning in a step-by-step Task Analysis fashion (Sulzar-Azaroff, B., 1991; Kaplan, J., 1985). This sequence training, composed of encoding and decoding exercises (Sternberg, R. J., 1985; Kamhi, A. G. & Catts, H. W., 1989), becomes the bridge necessary for reaching higher order critical thinking levels.

This encoding-decoding and memory expansion bridge may be absent with traditional methods of teaching (see Figure 2) (Baddeley, A. D., 1986; Erland, J. K., 1989a). With students' visual and listening memory levels remaining in a static position, encoding-decoding ability suffers (Kamhi, A. G. & Catts, H. W., 1989; Hessler, G., 1982). Critical thinking does not result, and therefore test-taking ability does not improve.

Many classrooms routinely apply visual and tactile teaching methods (reading and writing) instead of the inter-modality methods of visual, listening, tactile, and kinesthetic. Auditory processing skill is a requirement for reading comprehension, written expression (Williams, L. V., 1983), math, and science acquisition (Meeker, M. N., 1991, 1969; Woodcock, R. W., 1978; Kaufman, A. & Kaufman, N., 1983; Kirk, S. A. & Chalfant, J. C., 1984).

Visual-tactile (reading and writing) methods are often taught with simultaneous whole-word instruction. This method involved visualizing the entire word as one form, and memorizing spelling or reading words as one entity (Flower, L., 1987; Fernald, G., 1943).

Reading, however, also requires auditory and visual sequencing and phonetic decoding skills, or phonics (Kamhi, A. G. & Catts, H. W., 1989; Rumelhart, D. E. & McGlelland, J. L., 1986). The two opposing simultaneous and sequential methods wax and wane with popularity in teaching methodologies.

However, the Orton-Gillingham-Stillman method incorporates visual, auditory, tactile, and kinesthetic language stimuli in teaching reading (Kamhi, A. G. & Catts, H. W., 1984; Gillingham, A. & Stillman, B. W., 1970, 1965). *Patterns and Systems Training* proposes to teach and integrate both simultaneous and successive methods, utilizing all four primary modalities, rapidly switching from one form to the other (Erland, J. K., 1992, 1989a). Underlying cognitive skills can be improved in the process (Meeker, M. N., 1991, 1969; Feuerstein, R., 1988).

Improving cognitive skills can not be approached blindly. Careful assessment and evaluation is necessary (Meeker, M. N., 1991, 1969). Classroom teachers do not routinely assess cognitive skills. Productive in-depth cognitive assessment and evaluation of students is not considered an option, due to insufficient time, and lack of specialized teacher assessment resources. Many classroom teachers often lack the advanced assessment training required to administer cognitive skills tests and evaluations (American Psychological Association, 1990). School psychologists, are overloaded with referrals to test severe cases and cannot devote time to assessing entire classrooms of students. They limit measurement and evaluations to remedial students with intelligence and achievement batteries.

Many districts do not authorize speech therapists, learning disability, or mentally handicapped specialists to administer cognitive testing although they are qualified to measure and evaluate. Although underlying cognitive weaknesses are a plausible explanation for academic skill deficiency, available cognitive skills data for the average classroom student is limited and often nonexistent.

Cognitive Behavior Modification advocates self-monitoring and self-instruction (Forrest-Pressley, D. L., MacKinnon, G. E. & Waller, T. G., 1985; Armbruster, B. B., 1983; Meichenbaum, D., 1977). Research has indicated that structured drill and practice in a Cognitive Behavior Modification format (Meichenbaum, D., 1977) are compatible with Suggestopedic accelerative learning methods (Erland, J. K., 1989a). These two methods combined form a base for academic and procedural skills learning (McDaniel, E. & Lawrence, C., 1990).

There is a current trend away from curriculum product-based teaching and toward the interactive process of learning (Dickinson, D., 1991). However, drill and practice can now be translated into interactive, cooperative learning. Higher-order thinking skills can be instructed through media applications, such as CD-ROM.

In a recent televised documentary debating the educational process in schools, it was noted that many teachers suffer from "work-fear inertia," an unwillingness to initiate new programs (Mudd, R., 1989). With the current movement of teacher empowerment in the classroom, teachers will be more open to implementing innovative programs. However, unless methodology is easy to implement, with minimal training requirements and immediately evident results, teachers will be slow to add new programs to their curricula. Educational technology, in the form of video and computer programs, can solve this problem (U.S. Congress, Office of Technology Assessment, September, 1989).

The United States suffers a 28.4% drop-out rate (The Heritage Foundation, December 21, 1990), with millions more illiterate adults needing training. Few of these adults ever seek training, and 50% to 75% of those who do sign-up drop out within the first few weeks (Bishop, M., 1991). It is the ever-increasing responsibility of the schools to produce literate individuals at early ages so this problem is prevented. To improve our literacy levels, we must foster student enthusiasm for learning, and dramatically reduce the dropout rate. Media technology avenues need to be seriously considered as a viable teaching method, not only in school settings, but also in adult learning centers.

When schools consider adding technology to assist in Quality Performance Assessment (QPA) computers are the technology medium considered. They are the most visible, have many software options, and have a learning mystique. An alternative technology for the average classroom is a consideration. Video-taped technology is cost effective and obtains results within a short time frame.

Video-taped training has five major advantages over computerized practice and drill programs:

1. Video technology is cost effective. While only one or two students can use a computer terminal and keyboard at a time, one video monitor can teach thirty or more students at one time.

2. Video-taped training activates and integrates all of the primary senses. It trains auditory-visual sequencing using a variety of voices and faces. These faces appear life-sized on a video monitor. CD-ROM

generally provides speakers on smaller screen formats (U.S. Congress, Office of Technology Assessment, November, 1989).

3. Video-taped instruction is time-effective. Several drill and practice segments can be taught in a thirty-minute time frame. This efficiency removes the drudgery in drill and practice sessions for both the students and the teacher (Mecklenburger, J. A., 1990). Conversely, the drill and practice sessions of computer programs are time consuming. Some computer programs may take as much as an hour or more to perform the hand-eye drill and practice session (U. S. Congress, Office of Technology Assessment, September, 1989).

4. Since programs can be transmitted through interactive long-distance learning networks, video-taped instruction is not only cost-effective, but equalizes learning opportunities (U.S. Congress, Office of Technology Assessment, November 1989). Many districts can receive the training simultaneously.

5. Finally, television is accepted readily by learners as they have grown up with this medium (Greenfield, P. M., 1984). Postman (1985) indicates that offering an entertainment world for instructional purposes appeals to students who have grown up utilizing a limited print world.

Conclusion

If cognitive memory and thinking skill foundations can be trained in short, 24-hour time frames, further investigation is needed to find out whether wider applications of video technology with more students can obtain these same benefits. Other comparison groups need to be established to determine the effects of video- and audiotape instruction.

Effective classroom management and a conducive environment are essential to successful learning. The tight structure and discipline in this study reflected the teacher's professional commitment and fifteen years of teaching experience. Student cooperation and respect for authority were additional factors in the positive results of this study.

Video technology needs further research to examine whether results achieved in this study can be replicated in other learning environments within schools, adult learning centers, business and industry. New teaching concepts and methods that incorporate Cognitive Behavior Modification and Suggestopedia can be explored in a variety of teaching contexts. Parents, teachers, trainers, social service agencies, school and business administrators need to be open and willing to adopt new accelerated learning programs and methods that generate concrete results.

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* * *   * * *   * * *

Resumen. Este estudio pre-post y cuasi-experimental se conducía en una escuela pública de la quinta clase para determinar los efectos de instrucción con vido-grabadora en el enseñar destrezas de anális y el descubrir modelos. La metodología incluyó principios de la Modificación de Conducta Cognoscitiva, Sugestopedia, y la Estructura del Intelecto según Guilford dentro de la Dicotomía Siguiente y Simultánea según Kaufman y Kaufman. Unos elementos de aprendizaje simultáneo y siguiente, el modelar y el auto-amonestar fueron componentes básicos del Entrenamiento de Modelos y Sistemas. El hipótesis fue que determinar si cognoscitivas destrezas mejoradas para crear la destreza de pensar ordinalmente facilitaría el mejorar del leer. Pruebas estandarizadas de destrezas cognoscitivas se administraron antés de, y después de, entrenamiento para determinar si la mejorada destreza simultánea y siguiente generalizaría a la mejorada capacidad de leer como moderado en las pruebas estandarizadas de éxito académico en el distrito. Ganancias significativas se obtuvieron por el grupo adiestrado con video-grabadora en Modelos y Sistemas en las pruebas SRA de Leer y Matemática.

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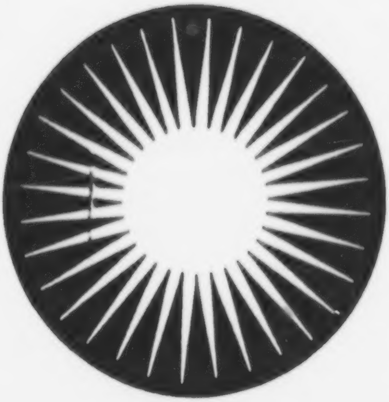

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Suggestopedia and Neurolinguistic Programming: Introduction to whole brain teaching and psychotherapy

Daya Singh Sandhu, Editor
University of Louisville

Editorial introduction. If holography is defined as all in one; one in all; all human knowledge about our universe may be viewed as holographic in nature. Sometimes we divide it into tiny pieces to study it minutely; at other times, we combine its different parts and make them interact to produce better and diverse results. Very often, we take the opportunities to combine our knowledge and experiences of diverse fields to construct new configurations and to expand our knowledge. However, sometimes we have to compare and contrast two different fields to affirm the validity of new but powerful breakthroughs which elude the scrutinies and imperatives of prevalent scientific methods.

This special issue contrasts two such fields, Suggestopedia and Neurolinguistic Programming (NLP). The main theme of this issue is to underscore the similarities be-

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tween these two whole brain based approaches: suggestopedia which mainly deals with the science of teaching, and NLP which mainly focuses upon the art of therapy.

The simultaneous emergence of Neurolinguistic Programming in 1975 with *Structure of Magic I* in the United States and Suggestopedia in 1978 with *Suggestology and Outlines of Suggestopedy* in Bulgaria is a striking coincidence that was partly based upon the renewed interest in Eastern philosophy. To understand the hypermnesic abilities, Georgi Lozanov, the originator of Suggestopedia sought after Raja Yoga and Indian Audhani who knew the Vedas by heart. To find quick and sure cures in therapy, Richard Bandler and John Grinder turned to Zen philosophy. Sid Jacobson (1983), another proponent of NLP, explains in his book, *Metacation* that Eastern philosophy has become fascinating to many people in our culture because it is so full of truths. The underlying cardinal truth in these two approaches is recognition of the unconscious mind and its powers and prominence. Succinctly stated, the answers to our problems is *within* us and not beyond and outside. Hence, therein lies the significance of learning about self-healing and *psi* abilities or energies which are known to Yogis as *prana* and to Chinese healers as *Chi*.

Since unconscious mind is considered to be the storehouse of all the abilities to learn and to heal, both Suggestopedia and NLP focus upon its untapped reserves for accelerative results. The proponents of Suggestopedia assert that through harmonization of altered states of consciousness, rhythms of recitation, special breathing practices and baroque music, we are able to spiral into the reserves of the mind. This process increases the necessary awareness which can be used to select and control our perceptions to become self-developed. These assumptions are deeply grounded in the philosophy of Raja Yoga. On the other hand, NLPers suggest that NLP is the study of the subjective experience that resides in the unconscious mind. It is out of the unconscious mind that people operate out of their internal maps. However, the map people create of the world around them is not real; it is divorced from the actual through neurological, social and individual constraints. This concept is imbued deeply with Zen philosophy.

It is worthy to note that Suggestopedia mainly focuses on the issues related to pedagogy, but it has therapeutic spin-offs. On the other hand, Neurolinguistic Programming mostly deals with psychological problems, but it has spin-offs in teaching and learning. In this sense, these approaches complement each other. They may be considered as two sides of the same coin from a holographic viewpoint.

The royal road that connects Suggestopedia and Neurolinguistic Programming is the use of suggestion. Actually suggestology could be called the backbone of these two approaches. It is through suggestology that this union is consummated between the conscious and the unconscious to create a higher state of superconsciousness. The latter generates expanded abilities to learn and teach in Suggestopedia, and to heal and provide emotional catharsis in Neurolinguistic Programming. The derived positive expectancy through suggestion is the very *life force* that is found in Yoga. Both Suggestopedia and NLP as models create this positive expectancy through step by step procedures, the former through relaxation, music, and breathing, and the latter through the embedded commands as practiced by Milton Erickson (1967). The end result of these approaches is a Pygmalion effect when the subjects free themselves from the strains of the "logical", the conscious part of mind which mostly casues negative barriers.

Both the practitioners of suggestopedia and the therapists who employ meta-tactics, special techniques of Neurolinguistic Programming, have reported incredibly startling positive results in their endeavors. Such is the power of the subconscious mind that Lozanov reports to have accelerated memorization by the suggestopedic methods 25 times more than the traditional methods. On the other hand, NLPers like Dilts, Grinder, Bandler, and DeLozier (1980) claim that now they can provide 5-minute guaranteed cures for phobias in psychotherapy, resolve deadlocked negotiations in business in a quick graceful manner, and can teach educationally handicapped students impossible skills in minutes. These master practitioners call NLP an ultimate behavioral engineering tool which yields magical results. This can explain why these proponents of NLP prefer to entitle their books with the word *magic*, such as: *Magic in Action (1984), Practical Magic (1980),The Structure of Magic I (1975), The Structure of Magic II (1976)*, etc. Such results are not far from supernatural feats reported in the Eastern cultures.

Both whole-brain based approaches, which largely draw upon the hidden abilities of the powerful subconscious mind, are not without their critics. Lozanov laments that when miraculous results attained through suggestology are published, it provokes a dogmatic reaction with one simple statement, "It is impossible." A constructive scientific discussion does not even ensue and replication efforts are rare. Thomas Scovel (1979), a noted critic of Georgi Lozanov's book, *Suggestology and Outlines of Suggestopedy,* complains that "Unfortunately, a careful reading of this book reveals that there is precious little in suggestology which is scientific...and at worst (*it is*) nothing more than an oversold package of pseudo-scientific gobbledygook!" In a similar tone, Kraft (1983) acknowledges the NLP model as being heralded as the quantum jump in the understanding human behavior, but questions its scientific basis. A much stronger charge is made by Conway and Siegelman (1983) that "in their efforts to market NLP... Bandler, Grinder, and their colleagues have been disrespectful of the imperatives of scientific enterprise." Furthermore, Conway and Seigelman (1983) expressed the concern of NLP's detractors that "the technique is not snake oil...in the market place, the technique threatens to become a hazardous tool for personal manipulation, and in the wrong hands, a dangerous instrument of social control." At best here, some effect is recognized.

One common response to these criticisms that Suggestopedia and Neurolinguistic Programming don't yield promised results is that the researchers are not adequately trained themselves in these approaches to carry out successfully the research studies in which they engage. In personal communication with this author, John Grinder wrote on February 15, 1984: "I have built a series of models-- step by step procedures which when followed yield predictable and high quality results in the real world. The isolation of one or more procedures in the artificial environment of a designed experiment is hardly practical in my understanding."

Another NLPer, Dilts (1983) responds to this criticism by adding that "Research that attempts to evaluate the truthfulness of a model's claims generally does so on the basis of statistical averaging and other statistical computations. Because NLP is concerned with identification and utilization of behavioral patterns in ongoing interaction, statistical quantities are of no value to us" (p.65). Furthermore, Dilts, Grinder, Bandler, and DeLozier (1980) admonish:

> We are modelers and we ask that you evaluate this work as a model, ignoring whether it is true or false, correct or incorrect, aesthetically pleasing or not, in favor of discovering whether it works or not, whether it is useful or not.

Well, there are many proponents and opponents in favor of and against the claims made in these two powerful approaches. The best can be said at this time is that the controversy is not over yet about the incredible promises made in NLP as the most dynamic therapy available at the present time. This special issue explores such issues with the readers about NLP which are perhaps also relevant to similar concerns about Suggestopedia.

The lead article, *Suggestology and NLP: Are There Similarities?* by Harry Stanton focuses upon the major theme of this special issue. A number of strategies and techniques as practiced in NLP are presented. The author accomplishes his objective very successfully in demonstrating that the positive mental attitude, relaxation and visualization are the common bridge between these two approaches. In the next paper, *NLP: Pre-clinical Experience*, Robert Saltmarsh has presented applications of NLP in the training of teachers to accelerate and add interest to teaching and learning processes. Saltmarsh sums up his impressions about the efficacy of NLP by stating that teachers who are knowledgeable about NLP will be better equipped to help the disabled and discouraged students.

Sandhu and Fong have attempted to empirically verify the claims of NLP proponents about their Eye Movements Model. They conclude that people can be identified as visuals, auditory, and kinesthetic as postulated by NLPers. These authors argue that most of the previous studies failed as many researchers overlooked asking their subjects to recall information under stress.

In *Neurolinguistic Programming: Magic or Myth?* Marcus Tye has presented an excellent integrated review of the NLP literature. The NLP Meta-Model and Primary Representational Systems are described in detail to acquaint the readers with the very basics of Neurolinguistic Programming. A well balanced critical analysis of research, theory, and practice of NLP is also presented. Marcus Tye has made a major contribution advancing his new concept of "psycho shaman effect." Perhaps, the awesome power of the subconscious mind shared both in Suggestopedia and Neurolinguistic Programming can only to be explained to the readers in such new terms.

Finally, Harry Stanton's *Reducing Stress with the Theatre Technique*, is an empirical demonstration of NLP applications of therapeutic techniques in educational settings. It is bold proof to contend that education and therapy are intertwined. In other words, Suggestopedy and NLP cross-over each other to prove what Epictetus told the ancient Greeks that knowledge is "The same, but different."

This special issue will hopefully advance further study into these joined fields. Whether a fad or unexplained goldmine is found are the concerns that will require disciplined study. It is fortunate that this journal provides a forum for this and other critical issues in education and counseling.

--Daya Singh Sandhu, August 22, 1994

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Suggestology and NLP: Are There Similarities?

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Abstract. A description of NLP together with a brief outline of some of the research findings pertinent to its effectiveness precedes a consideration of the similarities between this learning modality and Suggestology. These include the creation of a highly positive mental attitude, meditation, distraction and visualisation. When both NLP and Suggestology are conceptualised as subsets of hypnosis, the key elements of relaxation, suggestion and imagery are seen to be very prominent in both learning approaches.

* * * * * * * * *

Neuro-Linguistic Programming (NLP) postulates that all behaviour is the result of neurological processes, that neural processes may be represented as models through language and communication systems, and that system components can be organised to achieve specific outcomes (Dilts, et al., 1980). The model is derived from studies of outstanding therapists such as Milton Erickson, Fritz Perls, and Virginia Satir, and clarifies what it is that effective communicators do, identifying specific tools which can be applied to secure any behavioural outcome. Neuro-Linguistic Programming indicates both how people communicate to themselves and how they can use language to influence people. It is a model of how our brains work, how language interacts with the brain and how to systematically achieve desired results.

The function of a model is to arrive at things which 'work', not things which are 'true.'

The Neuro-Linguistic Programmers (Bandler & Grinder, 1979; Dilts, et al., 1980) claim very positive results from the application of their approach. There is, however, a lack of experimental evidence to support these claims. Both Heep (1987) and Sharpley (1987) have been somewhat critical, the latter pointing out that only 14% of the 44 articles he reviewed supported their position. Einspruch and Forman (1985) believe, however, that because Neuro-Linguistic Programming is more complex than researchers have assumed, it has not been adequately evaluated.

NLP principles, though not easily validated in the laboratory, are enthusiastically endorsed by clinicians in the field for the techniques do seem to produce desirable outcomes over a wide range of contexts (Stanton, 1988a; 1988b). As the Neuro-Linguistic Programmers put it, the map is not the territory, and we can chose to represent events to empower us rather than to limit us. This schism between theory and clinical effectiveness has been expressed by Sharpley (1987) when he says:

> "...though the proponents of NLP claim its underlying principles to be true, they have little to support them...in the research literature. If, however, NLP is presented as a "theory-less" set of procedures gathered from many other approaches to counselling, then it may serve a reference role for therapists who wish to supplement their counselling practice." (p.106).

Though, in terms of theory, it might appear that Suggestology has little in common with NLP, its emphasis on the practical, on things that 'work' is a shared reference point. However, many of the specific techniques practitioners of NLP use to help their patients have considerable similarities to those used by Suggestology practitioners to encourage learning.

In their first stage, that of preparation, practitioners of Suggestology create a highly positive attitude among students by convincing them their learning will be more efficient and pleasant than it has been in the past. By creating such an expectancy of success, Suggestology places itself in the broader context of psychotherapy, of which NLP is one example. As Torrey (1972) has indicated, all therapeutic approaches attempt to generate such an expectancy so that therapy becomes a process which takes place between believers.

Suggestology uses relaxation techniques such as Hatha Yoga, Zen breathing and imaginative meditations exercises to achieve physical well-being, freedom from muscle tension and stillness of mind. Mental recreation of earlier pleasant learning experiences and the imaginative re-experiencing of the pleasant feelings associated with these situations plays an important part in such meditations.

NLP, too, uses various techniques to achieve this end. Creating a resource state is one such approach. Clients remember a very positive experience in their past, revive it as vividly as possible in sounds, pictures and feelings. Once they re-experience the powerful positive feelings originally generated by the experience, they link it to an anchor, such as a clenched fist. In future, triggering the anchor brings back the positive resource state.

Another NLP technique designed to achieve positive mental states is that of submodalities. This technique (Bandler, 1985) is based on the concept that we should not allow our minds to make us feel good or bad in response to any picture they want to show us. Instead, we can use submodalities to control the way we feel. We could, for example, think of a pleasant memory and, by turning up the brightness of our mental image, make it even better. On the other hand, to reduce the power of an unpleasant one, we might dim the image or push it away into the distance.

Brightness and distance, together with size, colour, depth, duration, clarity, contrast, movement, and speed, are submodalities which are particularly useful in modifying mood state. Bandler believes that these are best used when varied one at a time, permitting an individual to learn which one or ones work best for him or her. It is then possible to increase the change effect by combining them, as when a pleasant memory might first be seen as a movie rather than a still slide, then be pulled closer and made increasingly bright and colourful. Conversely, an unpleasant memory could be made inconsequential by dimming it, reducing it in size and removing the colour.

The association/dissociation dimensions are also very valuable. An associated image is one in which the experience is relived as if it is being seen through a person's own eyes; dissociation has the memory image visualised with the person as part of the scene. When it is associated, memory recall encourages people actually to re-experience the original feeling response they had at the time the event took place. Should it be dissociated, memory recall has people seeing themselves in the picture having the original feelings being present, but not experienced internally.

In Suggestology's second stage, presentation, the 'seance' approach is employed to create a state of relaxed passivity, encouraging students to enter a 'different world'. NLP does something similar with the theatre technique (Bandler, 1965).

Patients imagine that they are sitting in the middle of a movie theatre. On the screen before them, they "see" a black-and-white snapshot of themselves in a situation just before they had the particular phobic response. They then float out of their bodies up to the projection booth of the theatre, where they can "watch themselves watching themselves." From that position they are able to see themselves sitting in the middle of the theatre, and also see themselves in the still picture which is on the screen.

That snapshot up on the screen is then transformed into a black- and-white movie, which is watched from the beginning until just beyond the end of the unpleasant experience. When patients get to this end point, they stop the movie, make it into a slide, turn it into colour, then jump inside the picture and run the movie backwards, taking only 1-2 seconds to do so. Everything is to take place in reverse with people walking and talking backwards. Through making a previously unpleasant experience ridiculous, patients often free themselves from its negative effects.

Distraction is another technique which has a place in the armoury of Suggestology. Students listen to the music rather than to the teacher's voice as he/she enunciates the foreign words, allowing the words to come to them without making any particular effort to learn them. NLP uses embedded suggestions such as quotations to achieve the same end. For example, a child having trouble with learning to read might be told a story about a boy tackling some difficult task who is told by a powerful character in the story that "You can do this" or "When you overcome this problem, and you will overcome this problem, you will feel marvellous, able to do many more wonderful things in the future."

In general terms, both Suggestology and NLP emphasise visualisation in their use of the imagination. The Suggestology seance is a vivid example of this, drawing heavily on the imagination of the students involved. NLP also makes great use of visualisation as demonstrated by the Swish technique.

The technique embraces several steps, the first of these being the identification of context. This is to determine where or when people would like to behave or respond differently than they are now doing. A woman wishing to lose weight, for instance, might identify the kitchen as the situation where changed behaviour might be helpful.

The second step entails identification of a cue picture, clarifying what it is that people actually see in that situation just before they begin doing the behaviour that they would like to change. This needs to be an associated picture, seen as if they are looking out of their own eyes but without seeing themselves in it. For the overweight individual, this cue picture might be of her hand reaching out for the refrigerator door.

Creating an outcome picture comes next, this being a dissociated image of how people would see themselves differently if they had already accomplished the desired change. This image is to be adjusted until it is really attractive, creating a strong belief that the desired change is possible. For a person wishing to lose weight, an appropriate outcome picture might be one of herself standing on a set of scales which were registering the weight she wished to be.

The actual Swish begins with a person seeing the cue picture big and bright, then mentally placing a small dark image of the outcome picture in its lower right hand corner. This small, dark image is to be mentally "zoomed" so that it grows big and bright, completely covering the first picture, which will become dim and vanish. The process must be fast, taking only 1-2 second. Once the Swish has taken place, the mind is blanked out or the eyes opened. This procedure is repeated a total of five times, each time with a blanking out of the screen or an opening of the eyes as the end of each swish.

The final step is a test, with the first image being pictured. If the Swish has been effective, this will be difficult to do, for the picture will tend to fade away and be replaced by the second image, that of the person as he or she wants to be. Should this not occur, it is necessary to repeat the Swish pattern.

Verbal suggestion may accompany the swish if desired and it definitely does play an important part in the seance procedure, providing a link to the visualisation. Verbalisation alone is, of course, widely used in the practice of Suggestology where the emphasis upon positive encouragement is present at every stage of the process. NLP also uses verbal suggestion extensively, employing the process of reframing to change perception. A mother annoyed by her three year-old son's constant questioning might experience a shift in perception if it was suggested to her that she was fortunate to have a son with such an inquiring mind. That is, both Suggestology and NLP reframe negative statements so that they become more positive.

In conclusion, I believe the main similarity between the two approaches is that both Suggestology and NLP are hypnotic procedures. Erickson (1977) has defined hypnosis as a state of inner absorption and it is this state which is accessed by Suggestology's meditative procedures and by many NLP techniques. Their Time Line method (James & Woodshall, 1988), for example, has people turning inward to identify where they place their past and where they place their future, this usually resulting in the past's being placed to the left side of the head for a right-handed person, and the future to the right side of the head. In other cultures, the Time Line might extend from front to back of the person's head. Once people are able to identify the position of their Time Lines they can modify their past and create a very positive future for themselves.

With Suggestology and NLP seen as subsets of hypnosis, similarities between them become more marked. Previously, I (1982), have operationally defined hypnosis in terms of three elements. The first of these is relaxation. With both Suggestology and NLP, relaxation is used either as part of a definite procedure, such as Yoga, or as a naturally occurring aspect of people's becoming absorbed in their own inner worlds. The second element is suggestion which plays an important part in both approaches. Imagination, the third element, is also integral to both Suggestology and NLP.

Thus it would appear that there are definite similarities between the two approaches. Both access the inner worlds of their practitioners enabling them to improve their performance above that attained by more conventional means. There are many paths to the achievement of such improvement, but Suggestology and NLP must surely rank as two of the more effective.

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Resumen. Una descripción de PNL junto con un breve trazado de unas recomendaciones de investigaciones pertinentes a la eficacia precede una consideración de las semejanzas entre esta modalidad aprendizante y sugestología. Estas incluye la creación de una actitud mental positivísima, meditación, distracción y visualización. Cuando ambos PNL y sugestología se imaginan como subgrupos de la hipnosis, los elementos críticos de relajación, sugestión y imaginaría se ven muy prominentes en ambos acercamientos de aprendizaje.

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Neuro Linguistic Programming: A Pre-Clinical Experience In Educational Psychology

by

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Abstract. NeuroLinguistic Programming is a model of the communication process oriented toward, and getting, useful results. Techniques include observation of learners' thinking styles, developing rapport, selecting language patterns, using classical conditioning, and flexibility in achieving learning outcomes.

* * *   * * *   * * *

Introduction. The psychologies of teaching and learning are growing in many ways and are offering many promises to accelerate and add interest and convenience to learning processes.

There is a new model for understanding how communication processes occur and how to increase precision and skill with them. The model is called Neuro Linguistic

Programming (NLP) and was developed by John Grinder and Richard Bandler (1975, 1976). NLP skills are natural, easily verifiable, and oriented toward getting useful results. Of interest to all educators is a basic postulate of NLP which insists that the meaning of any communication unit is the response that it gets. For teachers this has far reaching implications. It simply is not sufficient to know your material and to be articulate, if these factors do not get desired results from learners. NLP promises a wide array of alternatives for getting these results.

The array includes: precise observation of learners' preferred thinking styles; unique skills at developing and maintaining rapport at both conscious and pre-conscious levels, awareness of, and skills with, language patterns and selection, educational applications of classical conditioning, and most importantly - a set of attitudes which permit flexibility in achieving learning outcomes.

What Is NLP?

In developing this model, Grinder and Bandler have drawn from the pragmatic aspects of classical and contemporary psychology as well as established research in the neurological functions of the human brain (Pribram, 1971, 1974, 1975; Kinsbourne, 1972; Kocel, 1972; Galin & Ornstein, 1974).

The result is that this model does have a data base despite some charges that its precepts are premature or speculative.

A condensed and perhaps simplistic synthesis of neuro linguistic programming is as follows:

> When you *look* at it clearly and *sound* out the meaning of NLP you can get a *feel* for what it represents:
>
> *Neuro-*
>
> Our conscious and unconscious processes operate because of the magnificent potential in each of those remarkable cells in our brains and throughout our bodies called NERVES.
>
> *Linguistic-*
>
> We give names (in word form) to all the many experiences that are important to us. Thus, you can experience a picture, a smell, a sound, or the touch of an animal that is not present as you read this word: H O R S E. So these words or symbols are abbreviations for actual experiences that we can remember or create. We live through our LANGUAGE(s).
>
> *Programming-*
>
> We use words to establish patterns of meaning, skills, remembering, and all of our activities. Once these patterns are established they tend to operate

automatically and become habits. There are good things and bad things about habits:

Good Things:

1. Automatic skills such as TYPING, DRIVING, and READING.
2. Freedom to do other things while performing habitual patterns.
3. We can re-program ourselves.

Bad Things:

1. Continued use of obsolete patterns which are dysfunctional and/or maladaptive.
2. Reduction of choice.
3. Close-mindedness.

The Teaching and Testing of NLP Concepts

It is generally assumed in teacher preparation programs that prior to the clinical experience of student teaching, each undergraduate is provided with the requisite skills for acceptable, if not optimal, classroom performance. This assumption has seldom passed all of the reality tests. Therefore the traditional content and processes of educational psychology remain under question and open to revision. NLP is an inexpensive, available, and powerful addition to the preparation processes to which future teachers are exposed and by which teaching competence can be advanced.

After extensive personal exposure to and practice with principles and skills of NLP, it was decided to redesign one section of the undergraduate educational psychology course and focus upon the mastery of these basic skills adapted to the art of teaching. There was no intent or effort to compare effects shown in this section with those shown in sections taught traditionally. Rather the purpose of this paper is to share the basics of NLP and to describe effects of projects involving the model.

The first step was to teach the students about a basic ingredient in NLP for understanding human experience: THE SENSORY-BASED 4-TUPLE. The term "TUPLE" refers to a matrix or collection of variables that fluxuate in combination with one another. This implies that regardless of the complexity of any experience, it is ultimately coded by what is seen, heard, felt, smelled, or tasted. The encoding processes enable the neural system to accept, accommodate, assimilate, store, retrieve, and generate experiences. The four sensory channels into and out of the neural system make up the NLP 4-TUPLE. Whether any experience is immediate and generated by the environment or is not immediate but internally generated in memory or fantasy, we all build all awareness from these basic four varieties of sensoric information:

Visual - Internal or External
Auditory - Internal or External
Kinesthetic - Internal or External
Olfactory/Gustatory - Internal or External

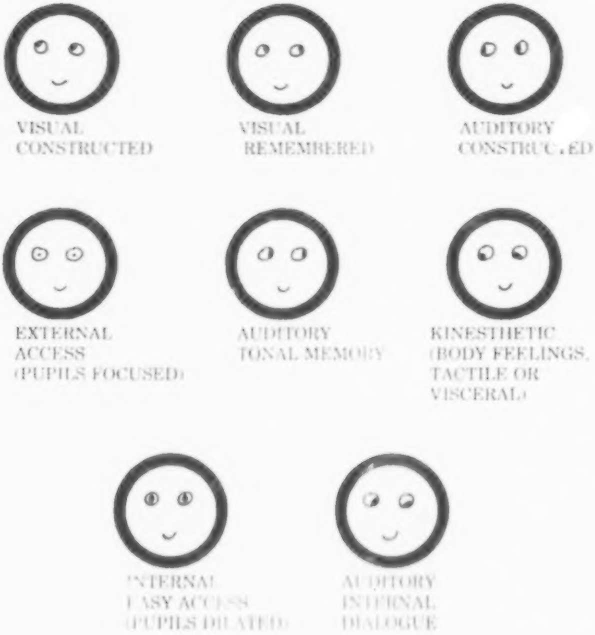
The second step was to teach the class that each person sequences the above types of information in unique ways during any process of understanding or communicating information. For example, some of us prefer to think by first making an internal image or picture, then internally talking to ourselves about the picture, then checking body feelings to determine correctness, then speaking outwardly to those who are the receivers.

The third step was to demonstrate that a person's eyes will move in predictable patterns as the different variables in the 4-tuple are accessed; see Fig. 1. The sequence by which a person accesses these different pieces of information is called a "strategy" and can be notated by using symbols; see Fig. 2.

Thus it is possible to elicit a person's strategy for any experience by means of appropriate questioning, observation of eye movements and awareness of predicate preference. (When a person is in the auditory mode, there is a tendency to use predicates like listen, talk, hear, sound, discuss, etc.; in

Figure 1

Predictable Patterns Of 4-Tuple*


VISUAL CONSTRUCTED
VISUAL REMEMBERED
AUDITORY CONSTRUCTED
EXTERNAL ACCESS (PUPILS FOCUSED)
AUDITORY TONAL MEMORY
KINESTHETIC (BODY FEELINGS, TACTILE OR VISCERAL)
INTERNAL EASY ACCESS (PUPILS DILATED)
AUDITORY INTERNAL DIALOGUE

Note. These patterns are typical in about 90% of right handers and about 50% of left handers. Horizontally reversed patterns are typically of those not included in the above percentages. Patterns may also vary within the same person as thought moves from one context to another.

*Bandler & Grinder (1979), page 25. Reprinted with permission from Real People Press, Moab, Utah.

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Figure 2

Strategy Symbols

$A^{e}_{t/d}$	A^{i}_{d}	V^{i}_{r}	A^{i}_{c}	K^{i}_{v}
Auditory External Tonal & Digital (Somebody said something to me.)	Auditory Internal Digital (I went inside and told myself what they meant.)	Visual Internal Memory (I make a picture of same or similar events from my personal history.)	Auditory Internal Construct (I create a novel series of words and sounds and prepare to speak.)	Kinesthetic Internal Visceral (I check my images and auditory messages by noticing body feelings which either match or mismatch my criteria for appropriateness.)

Strategy Symbols And Subscripts

V - Visual
A - Auditory
K - Kinesthetic
O - Olfactory/Gustatory

Superscripts:
e - External
i - Internal

Subscripts:

Auditory
t - Tonal
d - Digital

r - Remembered
c - Constructed

Kinesthetic
t - Tactile
v - Visceral
p - Proprioceptive

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the visual mode, predicates include see, view, appear, picture, look, etc.; in the kinesthetic mode the predicates are like: touch, push, feel, hard, handle, move, balance, etc.). A teacher's ability to match the language preference of the learner is predicted to enhance levels of rapport.

Use of the Basic NLP Skills in the Preparation of Teachers

An important assumption for educators is the notion that a good way to learn to do something well is to find a person who already does it well, elicit their strategy and use it as a model for developing your own skills. Therefore, a plan was made to recruit enough teachers who are identified as good ones and bring them to class so that the students could elicit strategies for "great teaching".

In five sections of the Educational Psychology course students were asked to identify one teacher from their schooling experience (not necessarily a "popular one") that has had positive and lasting effect on their lives. One hundred twenty teachers, so identified received congratulatory letters from the University. Twelve of them within easy travel distance were invited for the first of the "Great Teachers" seminars involving twenty-four students from one section of the Educational Psychology course. Thus, there were two students to work with each teacher. The task was to have the teachers identify a specific moment of "optimal" teaching and then elicit their strategy. The sessions with these professionals yielded some unexpected developments worthy of sharing with all educators and especially those who train teachers.

It was originally decided that an attempt to explain the information about eye movements and strategies might confound the teachers' natural response patterns. Therefore, the guests were instructed only that they would be interviewed by a pair of our students whose primary concern would be to discover the characteristics of optimal teaching experiences.

The format for the student interviewers was as follows:

1. Establish rapport by matching the teacher's posture, eye movement, and language preferences and conversational model.

2. Ask the teacher to identify a specific time and place when they were at their teaching "Best".

3. Ask them to "step inside the experience and describe it in first person, present tense as if it is happening "now".

4. Notate strategy by monitoring eye

movements and predicate language.

5. Assemble notations as a model for one event of "great teaching".

Results

Finding #1

Of the twelve teachers there were five who permitted the students to manage the interviews according to the assignment. These sessions yielded notations of their strategies when they were at their teaching best. A consistent characteristic of these five is the regularity of external accessing. In NLP, this is called "up-time". When in "up-time" a person's sensory channels are focused outward to receive information from the environment. When in "down-time" one's sensory channels are turned inward and involved in "thinking," internal dialogue, memory accessing, eidetic imagery and imagination. When in "up-time" these teachers were aware of the environment and especially of the students. Therefore they were able to receive a relatively constant flow of feedback during their teaching strategies.

Three of these same teachers had also enough time to access one of their teaching "disasters". Common among all three was the lack of up-time. Rather, when events signaled the challenges these teachers got stuck in "down-time" (internally talking, making pictures, and feeling anxious, or feeling in danger of losing control of the class).

It may be tentatively concluded that good teaching is heavily dependent upon the teacher's ability to see, hear, and feel students' moods and the constant processes of verbal and nonverbal change in the classroom. Conversely, poor teaching often is characterized by "down-time" strategies: The teacher decides what to say, says it, listens to it, congratulates self, decides what to say, asks self questions, answers them . . . ! The students' presence is not required.

Finding #2

Seven of the great teachers operated in such a way as to prevent the students from completion of the assignment. It should be emphasized that these remain excellent teachers, were very kind, and regarded themselves as cooperative. The description of the students after this session included notations such as these: "Our teacher felt compelled to share her philosophy." "Our teacher would start to answer each question and end up delivering a lecture." "Our teacher thought he had a mission to warn us about the pitfalls for beginning teachers." "Our teacher corrected my sentence structure."

For this group of teachers the essential finding was a consistent (but kind) refusal to relinquish control of the interview to the students. For all but one pair of students this was the source of confusion and frustration, but amenable. One pair spent most of the time listening to a lecture about the evils of authoritarian lecturing. All three of those participants parted with noticeable anger. That particular teacher rejected the validity of the assigned task. Repeated attempts by the students to intervene were unsuccessful and the lecturer lost his audience.

As a result of this finding in the first of the "Great Teacher" projects, efforts were devoted to the assertiveness skills necessary to cope with evasiveness, and/or outright resistance that might be innocently offered by such teachers.

In addition, an orientation period for the incoming teachers has since been provided prior to the interview. This included a brief explanation of the 4-TUPLE and eye-movements, followed by a video taped interview which elicits a master teacher's strategy. Conclusions about most appropriate strategy components are neither inferred nor commented upon during the tape.

Fourteen great teacher projects have now been completed, a total of one hundred sixty-eight different teachers from fifty-four different schools. Finding #1 (moments of good teaching are characterized by regular "external" accessing) has been consistently replicated each time. Finding #2 (teachers refusing to relinquish control of the interviews) has been rare. Observation of interviews from behind one-way mirrors has indicated that these control "habits" emerge consistently but, in most cases, are effectively encountered and dissolved by the student interviewers. It is hypothesized that the additional assertiveness training for the students as well as the added orientation session have operated to pre-empt much of the control tendencies among teachers.

Summary And Discussion

Finding #1, the ease with which good teachers remain largely in up-time, seems to call for the establishment of two competencies:

A. Mastery of content, so that information can be accessed easily without extended periods in down-time.

B. Elegance at receiving the great variety of nonverbal information provided constantly by students in classrooms and the flexibility to match patterns of communication accordingly.

Finding #2 from the original group of teachers was unexpected and points to some concerns about surplus control dynamics which may operate subtly even in the styles of teachers who are firmly established and respected as good ones. Aspects of teacher training which call these control issues into awareness are important and probably require periodic renewal of concern and in-service training. A third requirement may also be a capacity to be flexible at allowing appropriate shifts in the locus of control as learning processes evolve in the classroom.

Beyond This Particular Teacher Training Experience

The specific skills for teachers available though mastery of the NLP model are indeed promising. Gregory Bateson (1972) has made references to three levels of learning:

Learning I. Ability to memorize and recall.

Learning II. Learning how to learn in a variety of ways.

Learning III. Having developed an array of learning strategies, being able to either select the most appropriate strategy for the learning task at hand, or to synthesize an entirely new strategy that is congruent with a novel learning challenge.

Many students do not advance beyond one or two learning strategies. As a result, the same strategies are repeated as new learning demands are presented. Learning to multiply requires a different strategy than does learning the alphabet. The source of much learner dissatisfaction in classrooms can be found in the efforts which mismatch strategy to task. In the experience described herein, the goal was to get the models for "Great Teaching". If one's desire is to learn to multiply, find a great multiplier, discover the structure of that person's strategy, and then use it as a model for how to multiply well. The possibilities are endless for those who have mastered these basic NLP skills.

More critical for teachers is the notion that there are appropriate and inappropriate strategies for various learning tasks. Those who possess the newly established skills of NLP will have more choices about how to provide help to learners who appear stuck, disabled, or discouraged. It may become as urgent to teach strategies as it is to teach content.

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Resumen. La Programmación Neuro Lingüistica es un modelo del proceso comunicativo con

una orientación al lograr resultas útiles. Las técnicas incluyen observación del estilo estudiantil, desarollar la relación, escoger los modelos de lenguaje, usar el condicionamiento clásico, y flexibilidad en ganar el resultado de aprender.

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Identification of Primary Representational Systems: A Validation of the Eye Movements Model of Neurolinguistic Programming

by

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ABSTRACT. This study re-examined the Eye Movements Model of Neurolinguistic Programming to identify primary representational systems by using a newly developed 52-item inventory. The study supports the claims of NLPers that while accessing memory under stressed recalls to retrieve information, people do use different primary representational systems (PRS). Thirteen (13) yes/no type control items were used to demonstrate that identification of PRS is possible only under conditions when people are made to think hard for information.

Introduction. With its "high-tech" name, Neuro-Linguistic Programming (NLP), has emerged as a new approach to counseling and psychotherapy. Though not to be confused with computer programming, NLP does claim to program, deprogram, and reprogram clients' behaviors with the precision and expedition akin to computer processes (Sandhu, 1984). According to its pioneers, "NLP is the art of creating models of human excellence with a focus on communication and outstanding behavior in the fields of therapy, education, medicine, and business". (Grinder, Delozier, and Associates, 1984).

It is as a tool for therapeutic communication that NLP has rapidly gained attention among the helping professions since its origins in the early 1970's. The proponents of this newly developed therapeutic approach hail it as an "ultimate behavioral engineering tool" (Conway & Seigelman, 1983). Dilts, Grinder, Bandler, and DeLozier (1980) claim that through NLP they are "able to secure results--in 5 minutes a guaranteed 'cure' for phobias in psychotherapy; quick, graceful and satisfying resolution of conflict in deadlocked negotiations and settlements in business; success in teaching educationally handicapped children' formerly impossible skills measured in minutes - results which bordered on magical for the professionals of these disciplines". (Foreword to Neurolinguistic Programming, p. 1).

Kottler and Brown (1992) characterize Neurolinguistic Programming as strategic counseling that "combines the methods and theory from a number of disciplines into a dramatic action-oriented helping model that often requires but a few sessions to rid clients permanently of their presenting problems" (p. 128). More specifically, John Grinder, a linguist, and Richard Bandler, a mathematician and computer expert, borrowed freely and generously from diverse fields such as cybernetics, kinesics, linguistics, mathematics, neuropsychology, psychology, and psychotherapy in developing their Meta-model of doing therapy (Sandhu, Reeves, & Portes, 1993).

Some basic assumptions of NLP model

Proponents of the NLP Model strive to study the structure of subjective experiences of their clients through step-by-step procedures to yield the desired results. Moreover, they believe that this mosaic or kaleidoscopic structures of people's subjective are created by the interactions of sensory experiences received through input channels of the five senses, namely through seeing, hearing, feeling, touching, and tasting.

Furthermore, the NLP model contends that humans never experience the reality of the world. Whatever the reality, it is only experienced through the representations made by the five senses. For this reason, they have named the five senses as the representational systems and postulated that "the map is not the territory" (Grinder & Bandler, 1976, p.4). Dilts (1983) put it more clearly, stating that "the representations we use to organize our experiences of the world are not the world. They are neurological transformations that may or may not be accurate" (p.7).

Why do people have problems? The NLP proponents contend that the distortions created by these neurological transformations are one of the major contributing reasons . Grinder and Bandler (1976) assert that "when people come to us in therapy expressing pain and dissatisfaction, the limitations which they experience are typically, in their *representation* of the world, not the world itself" (p.3).

Lankton (1980) explains further that "what we sense externally (conscious or unconscious) we translate into internal representations that, in turn, mediate our behavior" (p.17). In nutshell, these "representational systems are the building blocks of behavior". (Dilts, Grinder, Bandler, & DeLozier, 1980, p.17). This explains why so much emphasis has been placed on the representational systems and their identifications in NLP research studies.

Primary Representational Systems and Their Significance

Grinder and Bandler (1976) explain that "to some degree, each of us has, potentially, the ability to create maps in each of the five representational systems. However, we tend to use one or more of these representational systems as a map more often than the others" (pp. 8-9). This most highly valued representational system is defined as the primary representational system.

The identification of this primary representational system is considered crucial in NLP. The main reason for the significance of the Primary Representational System (PRS) lies in the fact that only through PRS, a counselor or a psychotherapist can access the subjective experiences of the clients. Accessing the subjective experiences is imperative to "define and subsequently secure any behavioral outcome" (Dilts, 1980, et al. p.1). These behavioral outcomes could mean cure of phobias, successful sales skills, strong spelling strategies, getting rid of addictive behaviors (Sandhu, 1993) and successful solutions of a wide variety of other problems.

The NLPers also believe that to build good rapport with their clients, practitioners must identify their PRS and communicate with them through their specific Primary

Representational Systems (Bandler & Grinder, 1975, 1979; Harmon & O' Neill, 1981; Lankton, 1980). Theoretically, there could be five primary representational systems: auditory, gustatory, kinesthetic, olfactory, and visual. However, people mostly use only auditory, kinesthetic and visual representational systems.

The NLP theorists argue that if the therapists don't communicate with clients through their primary representational systems, their therapeutic efforts are doomed to failure. Grinder and Bandler (1976) present an example of a counseling session in which a counselor could not build therapeutic rapport for not being able to communicate in client's primary representational system:

Client (visual): "My husband just doesn't see me as a valuable person."

Counselor (kinesthetic): "How do you feel about that?"

Client (visual): "What?"

Counselor (kinesthetic): "How do you feel about your husband not feeling that you're a person?"

Client (visual): "That's a hard question to answer. I just don't know." (pp. 16-17)

Using Eye Movements to Identify Primary Representational Systems

Dilts, Grinder, Bandler, and DeLozier (1980) maintain that "They have noticed that the eye movements people make, as they are thinking and processing information, provide a remarkably accurate index for sensory specific neurological activity" (p.79). Dilts et al. also suggest the following paradigm to identify right handed persons' primary representational systems:

Accessing Cue	Representational System Indicated	
eyes up and to the left	eidetic imagery	(V)
eyes up & to right	constructed imagery	(V)
eyes defocused in position	imagery	(V)
eyes down & to left	internal dialogue	(A)
eyes left or right, same level of gaze	internal auditory	(A)
eyes down & to right	body sensations	(K)

(For the left handed persons, these eyes shifting positions are reversed.) (p. 80)

Review of Literature on Primary Representational Systems

The first and most celebrated review of such studies conducted by Sharpley (1984) revealed that "although there are several specific findings that provide support for NLP, the majority are either non-supportive (17/29) or uncertain (3/29), with only nine of these findings (i.e., less than one third) in support of NLP on this issue of the PRS and its use" (p. 246). For example, Owens (1978) empirically investigated the Eye Movements Model by asking 128 undergraduate students by posing nine stimulus cues. The participants had to respond according to their primary representational systems. The results of this study failed to support the claims of the NLPers. Thomason, Arbuckle, and Cady (1980) conducted a similar study by asking 30 questions to 40 subjects enrolled in an introductory psychology class. An examiner asked 10 questions in random order for three major visual, auditory, and kinesthetic sensory modalities. The results of this study did not support the claims of the NLPers about their Eye Movements Model. From such findings Sharpely (1984) challenged the credibility of NLP as a therapeutic procedure and demanded the verification of claims made by the NLP proponents because "the issues of accountability are of vital importance in the mental health field and the use of NLP because it is comfortable to counselors alone is hardly justifiable" (p. 248).

But Einspruch and Forman (1985) have discounted Sharpley's review of NLP studies. They criticize Sharpely by pointing out that he has failed to notice that "the authors of studies he reviews make fundamental errors by neglecting the NLP model of pattern recognition, linguistic communication, and therapeutic intervention" (p. 590). Furthermore, Einspruch and Forman (1985) have reviewed 39 available research studies themselves to demonstrate their flaws. They report several errors in these studies including researchers' unfamiliarity with NLP concepts and their failure to understand NLP as an approach to therapy. To prove their point, Einspruch and Forman (1985) have categorically reviewed all these 39 studies one by one to point out their glaring errors.

It is important to note that researchers have so far reported mixed results about the effectiveness of NLP as a therapeutic approach. Burton, 1986; Dooley & Farmer, 1988; Graunke & Roberts, 1985; Hossack & Standidge, 1993; Masters, Rawlins, Rawlins, & Weidner, 1991; Rawlins, Eberly, & Rawlins, 1991; Williams & Jacobson, 1989; Woerner & Stonehouse, 1988 all have reported NLP as an effective approach to therapy. On the other hand, Carbonell, 1986; Faulkender, 1985; Parr, Dixon, Yarbrough, & Rathael, 1986; Rogers, 1993; Sharpely, 1987 and many others did not find any significant results in their research studies.

Focus of the Present Study

From the preceding discussion, it is obvious that controversy about the assertions and claims of NLP proponents and opponents yet continues. If Einspruch and Forman (1985) are right in their criticism, then NLP can't be discounted as a non viable therapeutic modality at the present time. In addition to the criticism made by Einspruch, we also argue that most of these researchers have failed to develop and utilize instruments that are sensitive and allow for the empirical test of assertions in the NLP Eye Movements Model.

As Einspruch and Forman (1985) assert, most of the researchers have failed to yield the desired results because they did not follow the procedures advocated by the NLPers. For example, when an individual is asked to recall some bit of information that is not available in his/her immediate sensory environment, he/she must go through the process of accessing that information, either through memory or construction. (Dilts, 1983, p.17)

NLP has found that the direction and position to which an individual momentarily averts his eyes, when recalling information or answering a question, correspond to the representational systems he is accessing. (Dilts, 1983, p. 6)

Two key terms, recalling and accessing used in the above quotes are extremely important. We hypothesize that most of the previous studies have failed to identify primary representational systems because the respondents were not asked questions that were hard enough to make them recall answers. Task difficulty thus becomes an important variable. We propose that for the verification of Eye Movements Model, the researchers must ask questions which might force the subjects go through the process of accessing to retrieve information. Harmon and O'Neill (1981) have made a similar observation stating that "people use all their representational systems. However, most people will have a favored or 'lead' system that they rely on most exclusively in times of stress or when problem solving" (p.450). In sum, we postulate that shifts in the eyes of the subjects can only be witnessed if they are required to recall information under stress.

METHOD

Since most of the previous studies have failed due to the lack of appropriate instruments that are developed according to the assertions of NLPers, the present authors have a compelling reason to re-examine the Eye Movements Model of NLP. The following null hypotheses were constructed and empirically tested by using the Primary Representational Systems Inventory (PRSI), developed by the first author:

a. There is no significant difference between the total number of frequency counts of eye shifts in any one particular direction. (i.e. eyes up and to the right, eyes up and to the left, eyes level and to the right, etc.)

b. There is no significant difference in the frequency of participating subjects in this study as they are identified as visuals, auditory, and kinesthetic through the eye movements criteria of NLP.

c. There is no significant difference in the frequency of subjects with different primary representational systems as determined through eye movements and when these PRS's are self-reported by the subjects.

Participants

One hundred and two (102) right handed students from four educational psychology classes at a middle size university located in the south central Louisiana participated in this study. The participation in this study was on the voluntary basis. No class credits or any other type of rewards were made. These students filled out a personal data sheet which revealed that 58 (56.86%) of them identified themselves as French Acadian Americans (Cajuns) and 44 (43.14 %) as non-Cajuns. Fifty nine (57.84%) participants were women and forty-three (42.16%) were men. The purpose of this study was not discussed with the participants. However, all the participants read and signed the consent form to videotape their interviews.

Procedure:

All the participants were scheduled from 8:00-11:00 in the morning and 1:00-4:00 in the afternoon at half an hour intervals for two weeks to videotape interview sessions. Friday afternoons were not used for this purpose as the students were anxious to visit their homes. The interview sessions were scheduled in a manner that the participants did not need to miss their regular classes. A pre-interview protocol was prepared which was used for every interviewee. The graduate assistant, who was unaware of the purpose of this study, read the same directions to each and every subject as stated below before starting the videotaping session:

> This session will take approximately ten minutes. I am going to ask you to answer

> many questions. Each question is allowed 10 seconds. Try to recall or think hard the best you can before you give up and say: "I don't know" or "I don't remember." Are you ready?

Videotaping the Sessions

A special consideration was given to seating arrangements while videotaping these sessions. The subject and the interviewer sat face to face at a distance of approximately three and a half feet from each other in a small 12' X 12' conference room. Only one subject was allowed in this room at a time. A sign reading, "Session in progress, please don't disturb" was displayed on the door to avoid interferences.

A videotape camera was arranged in such a way that it focused mainly on the face of the subject. The room was well lighted, but to make clearer and brighter pictures a standing lamp was also used slightly behind the chair of the subject. The interviewer followed special instructions as stated below from a previous pilot study:

> Never ask the subjects to focus their attention in one and only one direction when videotaping their responses for scoring purposes. For example, statements such as: (a) Look at me...(b) Look at the

video camera before you answer can limit the free eye movements of the subjects. (Sandhu, 1991, p. 43)

Using the Primary Representational Systems Inventory (PRSI)

This study is distinctly different from others in its use of a special set of carefully constructed questions which made the subjects "to go through the process of accessing information, either through memory or construction" (Dilts, 1978, p. 17). These authors stress again that the identification of primary representational systems is possible only under stress recalls (Sandhu, 1991). For example, the following two questions from PRSI are shared with the readers to make this point clear:

Q. 1. Do you smoke?
Ans. Eyes response: (Most probably eyes will not shift in any particular direction.)

Q. 2. If you multiply 13 by 7 and add 11 to the product, what would be your answer?
Ans. Eyes response: (Eyes will shift in some direction to indicate the primary representational system, unless one gets so discouraged that without even trying to figure it out, s/he responds, "I don't know"). (Sandhu, 1991, p. 41)

The Primary Representational Systems Inventory consists of total 52 items. Equal numbers of question items (13) were related to visual, auditory, and kinesthetic contexts. Another set of 13 items was included which required only yes/no responses and did not put the respondents under any stress to recall or access memory for answers. These neutral items were used as control items to test the assumption that eyes will not shift in any direction. The authors of the present study postulated that the respondents' eyes for these items will be non-focused; in other words, the eyes will not shift in any one particular direction. These control items were also intended to provide attention relief for the respondents, as constantly accessing could become fatigue-inducing and a painful experience. All these 52 questions were finalized from original 73 questions after a careful review was made by three experts familiar with Neurolinguistic Programming. Furthermore, all these selected items were arranged in random order. The test-retest reliability coefficient in a pilot study of the PRS Inventory with 12 subjects resulted in a phi (Ø) coefficient of .82, which was considered acceptable in using this inventory for future research studies.

As suggested by Sandhu (1991), the following steps were taken for data analyses in the present study.

Training of Raters to Score Eye Movements

Two graduate students, naive to NLP Eye Movements Model and the purpose of this study, were trained how to score the eye movements from the videotaped sessions. Specifically, these raters were made aware of the following:

Intake or input:

The subject becomes attentive to listen to the question. Once the question is understood, the respondent breaks the eye contact with the examiner momentarily, (like the sign from the computer, one moment please!)

Process of Accessing:

The subject starts processing for the desired information. S/he looks for answers. The eyes start shifting in different directions .as postulated by NLPers. In some instances, the answer may occur to the subject when his or her eyes are in defocused state.

Output Response:

Subject answers the question. A subtle facial change takes place to indicate relief after stress. Eyes shift back to some other direction to punctuate their search for the answer.

Making Notations:

These raters were instructed to mark the directions of eye shifts when the subjects were thinking hard to recall or construct the information from their memory at the previous stated step (b), process of accessing.

Practice Through Pilot Study:

After receiving proper instructions on how to make notations, the raters rated eight different videotaped sessions of a pilot study separately. The inter-rater observer agreement percentages were calculated as:

$$\frac{\text{Total agreement}}{\text{Total agreement + Total disagreement}}$$

The results of this pilot study yielded 92% inter-rater agreement which was considered satisfactory to allow the coders to rate the videotaped sessions of the main study.

The coders were provided necessary forms to make their check marks, indicating the frequencies of eye movements in different directions. Both these coders rated 102 video sessions separately. All the ratings were completed in four weeks.

Statistical Analyses of the Data

All the frequency data from both the raters and for each subject were arranged separately under four categories: visual, kinesthetic, auditory, and non-focused. The term non-focused was coined by the authors to identify those responses which the subjects made spontaneously, without thinking hard and not moving their eyes in anyone particular direction. (Mostly yes/no responses to control items).

In order to determine the inter-rater agreement between the two coders, statistical procedures as explained by Cohen (1960) was used to calculate Cohen's kappa. This method for nominal data has also been recommended by other investigators in the past such as; Tinsley and Weis (1975); and Buckner et al. (1987). Since a strong coefficient of agreement (K=.84) was obtained, the frequency data of both raters were combined for further analyses.

A separate Chi Square test was calculated for each subject, taking the frequency responses in the four categories of visual, kinesthetic, auditory, and non-focused. Furthermore, in order to determine "which categories have been the major contributors to statistical significance, the standardized residual was computed for each of the categories as follows:

$$R = \frac{O - E}{\sqrt{E}}$$

(Where O stands for observed frequencies, R for standardized residual and E for expected frequencies). (Hinkle, Wiersma, & Jurs, 1988, p. 556)

Further analysis to determine if there were any significant differences between sexes, ethnic groups, and numbers of people identified as visuals, kinesthetic, auditory, etc., Chi Square tests of homogeneity were used.

After all the videotaping sessions were completed, a debriefing session was held with the subjects. At this time, the purpose of this study was explained and the subjects were asked to write on a piece of paper if they considered themselves as visuals, auditory, or kinesthetic. This information was used to match with results of this study.

Results

The results of this study are reported here categorically in the context of previously stated hypotheses:

Hypothesis 1: Individually performed one-sample case: The X^2 goodness-of-fit test for all 102 subjects showed a statistically significant difference in the frequency counts of 99 subjects at alpha level = .05 The first null hypothesis was rejected. In other words, when people were asked some information that required hard recall, their eyes shifted in a particular direction as postulated by NLP proponents. A summary of all subjects identified as: visuals, auditory, kinesthetic, fuzzy, and not clear, is presented in Table 1.

Table 1. Classification of subjects by sex and modality (N=102)

Sex	Visual	Audit.	Kines.	NotClear	Fuzzy
F	32	9	4	2	12
M	29	8	4	1	1
Total	61	17	8	3	13

Note: The data shown in this table were used for subsequent analyses, but the three subjects under the Not Clear category were excluded.

During the debriefing session, three subjects identified as having no particular primary representational system pointed out that they did not try hard to recall the information but just gave any answers or simply said they did not know.

Thirteen subjects were identified as having more than one primary representational system. Further analysis revealed that

12 of them had a combination of being visual and auditory and they were all female subjects. The 13th subject was a male subject who had a combination of auditory and kinesthetic PRS.

None of the responses on the control items was significant for PRS modality. However, some subjects did use a specific PRS even to answer the yes / no questions. The frequency scores of such subjects ranged from 0-19.

Hypothesis 2: The Chi Square one-sample goodness-of-fit test (X^2) indicated that there were statistically significant differences among the subjects identified as visual, auditory, kinesthetic and fuzzy (more than one) primary representational systems: X^2 (3) = 72.43, $p<.001$, N = 99. Hence, null hypothesis 2 was rejected.

Table 2. Chi Square Table for Equal Frequency of Primary Representational Systems

PRS:	Visual	Audit.	Kines.	Fuzzy	Total
(Obs.)	61	17	8	13	99
(Exp.)	24.75	24.75	24.75	24.75	99
(X^2)	53.09	2.43	11.34	5.58	72.44

The results from Table 2 imply that there is significant difference in the frequency of participating subjects after they are identified as having visual, auditory, or kinesthetic primary representational systems. An additional finding in this study suggested that some people could have more than one (fuzzy) primary representational systems.

Hypothesis 3. The Chi Square test of homogeneity in a 2 x 4 contingency table was employed to determine if there was any significant difference between the frequency of PRS as identified by the PRSI and as self-reported by the participating subjects. Since some self-reported frequencies were less than 5, Yates' Correction for Continuity (Hinkle, Wiersma, & Jurs, 1988, p. 565) was also applied. The results indicated significant differences between the identified and self-reported frequencies, $X^2(3) = 8.631$, $p < .0345$, $N = 157$. Hence, null hypothesis 3 was also rejected.

Additional analyses for identified and self-reported PRS were conducted for each separate category, visual, auditory, etc., by using previously discussed inter-rater agreement formula. These percentage agreements for visual, auditory, and kinesthetic were found as 78.69, 41.18, and

Table 3. Chi Square contingency table for homogeneity of Identified vs. Self-reported Primary Representational Systems

	Observed	Expected	X^2
Visual			
Identified	61	68.73	.76
Self-reported	48	40.27	1.30
Auditory			
Identified	17	15.13	.12
Self-reported	7	8.87	.21
Kinesthetic			
Identified	8	6.94	.05
Self-reported	3	4.06	.08
Fuzzy			
Identified	13	8.20	2.26
Self-reported	0	4.80	3.85

37.50 respectively. Not a single person self-reported having a fuzzy (more than one) primary representational system, resulting in zero percent agreement. The results imply that subjects are not conscious about their primary representational systems. According to this study the visual participants were more aware about their PRS's than subjects with either auditory or kinesthetic primary representational systems.

Additional Findings

Upon the conclusion of this study, several additional findings were found. First, 13 subjects as previously stated were found to have more than one primary representational system. The subsequent review of NLP literature evinced this phenomenon as a fuzzy function (Bandler and Grinder, 1975; and Lankton, 1980). For this reason, this new category was added to the other three primary representational systems: visual, kinesthetic, and auditory. It was interesting to note that the number of fuzzy representational systems for females were much higher as compared with those of male subjects, (F=12, M=1).

A re-examination of the videotaped sessions, revealed that 53% (9 out of 17) subjects identified as auditory, repeated experimenter's (graduate assistant) questions aloud or mumbled before answering them. Some visuals closed their eyes, some squinted them, and still some cupped them before giving their answers.

Twenty randomly selected videotaped interview sessions were selected for comparison. The response times of equal numbers of visuals, kinesthetic, auditory, and fuzzy PRS (5 each) were compared for the total inventory. Visuals' total response time was the shortest, followed by auditory, kinesthetic, and subjects with fuzzy PRS.

DISCUSSION

This research study examined the eye movements model of NLP to examine the validity of three primary representational systems as proposed by NLP proponents. The analyses of the data supported the claims made in NLP literature that people can be identified as visual, auditory, and kinesthetic. Furthermore, this study emphasizes the fact that this is possible only if the subjects access the information through stressed recalls. Thirteen yes/no items used as control items verify the fact that when people don't have to think hard, their eyes don't shift in any particular direction. It also became obvious that there are some subjects, (13/99) who use more than one PRS while making hard recalls.

This study also found that in a given population, the majority of people are visuals, followed by auditory, fuzzy, and kinesthetic. This study did not find that while answering contextually visual, auditory, and kinesthetic items, people use respective primary representational systems. On the contrary, this study supports the hypothesis that the people have developed a specific PRS which they use invariably when they have to access to their memory under hard or stressed recalls.

The subjects seem to have no conscious knowledge if they are visual, auditory, fuzzy, or kinesthetic. Most of them if asked like to perceive themselves as visual. More research studies are needed to validate the Eye Movements Model of NLP by using the PRS Inventory. Future studies that focus on gender, cultural, and racial differences are strongly recommended. It would also be interesting to make a comparative study between right handed and left-handed subjects.

Finally it is important that readers note some limitations of this study. It seems that some stress recall questions may be easier for some subjects than others. For example, the subjects with strong math background could easily respond to the math question cited earlier in this study with much less stress than others who are weak in mathematics. No other study has been conducted to determine if the primary representational systems would be the same if assessed with other measures.

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Resumen. Este estudio escudriñó el modelo de la Programación Neurolingüística (PNL) para identificar los sistemas primeros representacionales (SPR) por el uso del inventario nuevo desarollado con 52 números. El estudio apoya las pretensionas de la gente PNL que al accesar la memoria bajo tensión para recobrar información, se usan diferentes sistemas primeros representacionales. Trece (13) preguntas del tipo sí/no se usaban para demostrar que la identificación de SPR es posible solamente cuando la gente tiene que pensar seriamente por la información.

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Neurolinguistic Programming: Magic or Myth?

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Abstract. Neurolinguistic programming (NLP) is both a model and a set of techniques, with a dichotomy between its theory and practice. The utility of NLP techniques claimed by NLP practitioners stands in sharp contrast to the lack of scientific research support for both the underlying theoretical framework and the efficacy of those same techniques. This integrative article considers NLP from the point of view of experimental clinical psychology. The issues are discussed, and a "psycho shaman effect" is proposed as an alternative explanation for the effects.

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Introduction. Neurolinguistic programming (NLP) is both a model and a collection of therapeutic techniques. NLP was first suggested and later popularized by Richard Bandler and John Grinder in the 1970's (Bandler & Grinder, 1975a). Bandler stated that they formulated their theory of human communication and behavior "through the systematic study of Virginia Satir, Milton H. Erickson, Fritz Perls, and other therapeutic 'wizards'" (Bandler & Grinder, 1979, p. 3). Bandler and Grinder's names have become almost synonymous with NLP, and they have published several popular psychology books on NLP, hypnosis, and therapy. They have also conducted workshops throughout the United States, and have instituted a pyramid-style system of training and certifying NLP master practitioners and workshop leaders. More than 30,000 people have received at least some training in NLP (Harman & O'Neill, 1981).

Several of their books on NLP focus on the therapeutic techniques that they claim derive from their meta-model. Some confusion exists in the professional literature as to what aspects of NLP are most important, and even more confusion abounds about what techniques are properly considered a part of NLP. In part this may be explained by the fact that Bandler and Grinder themselves have arguably failed to present a clear, accessible description of NLP. They have not published in peer reviewed journals, and their books lack such scholarly conveniences as clearly marked chapter subheadings and indices (e.g., Bandler & Grinder, 1975a; Bandler & Grinder, 1975b; Grinder, 1981). One book is a continuous, un-annotated transcript of a multi-day workshop. While their books are often enjoyably conversational, they are not easily used to guide experimental research. The descriptions of NLP are not entirely consistent between the various books, and some sections are difficult to comprehend. Indeed, Bandler and Grinder note that their early writings are almost unreadable! One of them (not identified) writes the following about chapter four of *The Structure of Magic* (Vol. 1): "That's the only meaningful part of the book as far as I can tell" (Bandler & Grinder, 1979, p. 77).

In sum, the absence of a formal, academic presentation of NLP has led to considerable confusion in the research literature, with various investigators focusing on different aspects of NLP as being of central importance. Academic researchers have tended to focus on the Primary Representational Systems as revealed by eye movements (detailed below), finding little support for these theoretical aspects of the Meta Model. However, clinicians and educators have focused on case studies using NLP's quasi-hypnotic imaging techniques (also introduced below), and claim remarkable success.

This article contains three sections. First, the basic ideas of NLP are presented, and then research about the model is summarized. Second, some techniques of NLP are introduced, and research about the techniques is also summarized. Third, this article addresses the dichotomy between experimental psychologists, who are largely unfavorable about NLP, and NLP practitioners, who claim considerable success. A new concept, that of the "psycho shaman effect," is introduced as a way of accounting for the dichotomy and explaining the successes of NLP.

The Meta Model

Bandler and Grinder have described NLP as being a psycholinguistic theory which centers around a "Meta Model" having three main components (Bandler, 1982; Bandler, 1985; Grinder & Bandler, 1976). First, NLP postulates that people's thoughts, feelings, and the encoding of experiences are intimately tied up with language and are encoded in what they refer to as "deep structure". Second, NLP proposes that there are many communication errors associated with conscious accessing of this internally encoded psycholinguistic thought-experience structure. Third, NLP's Meta Model holds that people have primary representational sys-tems (PRSs). NLP states that people receive information via various sensory modalities, and there are surface structure internal representational systems corresponding to each of the sense modalities. A person's preferred or primary system corresponds to the sensory modality in which he or she is most efficient at gathering information.

Deep and Surface Structure

NLP suggests that it is possible to access the deep (true) structure of thought through a person's distorted surface statements, and that it is even possible to change a person's behavior through partially consensual psycholinguistic manipulation (hence the verb programming in NLP). NLP claims to be able to overcome resistance in this manner -- through the use of carefully chosen metaphors and paced presentations, a neurolinguistic "programmer" can overcome a resistant client and get behavior change to occur. How these metaphors are chosen relates to the person's PRS, which will be described below. An example (described in Dixon, Parr, Yarbrough, & Rathael, 1986) would be a client who sees himself or herself as weak and helpless, and who is strongly resistant to therapist statements to the contrary. The therapist would present a metaphor to the client, perhaps discussing the strength and resilience of a mint plant. According to NLP, if the metaphor is presented properly, the client will try to make sense of the image. People supposedly do this by taking verbs and images from the counselor's metaphor and applying them to a context that makes sense for themselves. By this process the client's resistance is automatically bypassed and the client's deep structure is affected -- the client accepts the metaphor and can now recognize his or her own strengths. NLP holds that this deep level of psycholinguistic structure is beyond direct conscious perception.

Communication Errors

The Meta Model outlines various types of communication errors that can occur when the content of the conjectured deep structure is accessed by conscious awareness. Four types of communication errors are said to occur: distortions, deletions, generalizations, and nominalizations (Harman & O'Neill, 1981). (1) An example of a distortion is a person's saying, "Republicans make me angry," whereas the person's actual deep linguistic representation is "I get angry when I hear Republicans talk." (2) An example of a statement evidencing deletion would be "I'm afraid" -- this statement omits the object that makes the person scared, and the object is a part of the deep underlying psycholinguistic structure, even though it is omitted during conscious recall. (3) An example of a generalization is, "People push me around" -- NLP holds that this person's experiences and neurolinguistic structure reflect only specific examples of people pushing the person around, and/or specific instances of the person allowing himself or herself to be pushed around. (4) An example of a nominalization would be a person's saying, "I regret not going back to school" if they live in a society that allows them the option to return to school. That is to say, this person's deep structure reflects a decision which can be reversed, whereas the verbalization contains a special sort of distortion in which the decision appears immutable.

Primary Representational Systems (PRSs)

NLP hypothesizes that information coming from each of the senses is processed into neurolinguistic representations, and that there are distinct representational systems (or deep structures) for each of the senses. These "surface structure" systems then feed information into the deep structure. Although everyone possesses a representational system for each sense, people have a primary or preferred sense from which they can gather and process information most quickly. These systems usually correspond to visual, auditory, or kinesthetic senses. NLP holds that people can also process information from other senses with the appropriate other (non-preferred) system, although in times of stress NLP suggests that they will fall back exclusively on their preferred sense and system. NLP also suggests that while a person may not be consciously aware of his/her PRS, it is possible for a trained observer to readily identify it. According to NLP, the three main types of representational systems have different eye movements associated with processing or accessing information from the system. NLP holds that these eye movements can be easily measured. Once the PRS is identified for an individual, addressing messages appropriately will provide for a more direct route into that person's deep structure. This PRS-matching is also referred to by NLP as predicate matching.

Predicate matching is distinguished from basic clinical skills such as mirroring and paraphrasing by the claims of rapid manipulation and change (programming) that can occur with successful predicate matching and appropriate linguistic imaging.

A Critical Analysis of Research, Theory and Practice

Broadly, neurolinguistic programming can be said to have two aspects, the psycholinguistic theory (the three-part Meta Model described above), and the therapeutic techniques. Next I consider research findings and describe current NLP practice.

Meta Model Research

NLP does not define a neurological substrate for the psycholinguistic deep structure in which experiences are encoded. The concept is very much reminiscent of early cognitive psychology, in that it is a conceptual black box, an interesting idea from which no experimentally verifiable hypotheses may be derived. Not surprisingly, research into NLP has rarely looked at the deep structure concept. This criticism does not mean the concept is not without value, but without further elaboration it should not be treated as any more than a colorful metaphor.

NLP treats communication errors as natural artifacts of accessing the deep structure of experience. While NLP advocates teach that these natural distortions can be overcome, they do not allow for the possibility that a person may consciously make these distortions. That is to say, they have removed personal responsibility for the creation of these cognitive distortions, although they allow for the distortions to be controlled by an aware person. No experimental verification is provided by Bandler and Grinder to show that people cannot deliberately create distortions. This is not an unreasonable alternative hypothesis. For example, a clinician might explain why some individuals would create distortions in terms of secondary gains (such as being able to feel sorry for oneself because one feels that everyone is unkind). Additionally, social psychology findings on stereotypes show that people readily make and utilize generalizations (e.g., Tajfel, 1981). This is at odds with Bandler and Grinder's contention that generalizations occur only during verbal access of the deep structure. Thus, communication errors are best thought of as a highly useful *description* of what people do, but NLP does not satisfactorily demonstrate that they result from neurolinguistic processes that occur in accessing deep structure.

Not surprisingly, neither communication errors nor deep structure have been examined in the NLP research literature. Communication errors are a description of behavior, and deep structure is a metaphor that does make predictions that one can attempt to refute in an experiment. However, the third aspect of the Meta Model, preferred representational systems, makes specific predictions about eye movements and therefore has been widely studied.

What particular eye movements correspond to has been defined somewhat differently by different authors. In general, visual processing/recollecting is said to correspond with upward subject eye movements, auditory processing with horizontal and down-left subject eye movements, and kinesthetic processing with down-right subject eye movements (Wilbur & Roberts-Wilbur, 1987).

Bandler and Grinder (1979) outlined the eye movements slightly differently, writing about the visual accessing cues of a "normally organized" right-handed person (p. 25). They did not explicitly define what they meant by normally organized. However, they described eye movements from the perspective of someone looking at the subject; in contrast NLP researchers have reported eye movements from the subject's perspective. This latter convention is used in this article.

Bandler and Grinder explicitly subdivided eye movements according to the following scheme: eye movements to the upper right (from the subject's perspective) indicate visual constructed images, movements to the upper left indicate visual remembered images, movements horizontally to the right represent auditory constructed sounds or words, and movements horizontally to the left represent auditory remembered sounds or words. Down left eye movements reveal generalized auditory processing. Kinesthetic feelings, including smell and taste, are revealed by down and right movements.

Bandler and Grinder have also identified two subtypes of auditory dominant PRSs (which can be differentiated by listening to how people speak, rather than by eye movements). The first, auditory-tonal, describes people who process best the emotional qualities of sound, and can be identified by people who describe social interactions in terms of whether others sounded angry or quiet. The second, auditory-digital, describes people who process logical verbal information most efficiently. According to Bandler and Grinder, the dominant PRS is visual in 40% of people, auditory-tonal in 5%, auditory-digital in 5%, kinesthetic in 45% of people, and mixed in the rest (they do not indicate any research or other origin for these statistics).

A comprehensive overview by Sharpley (1984) found no conclusive evidence that eye movements correspond to information presented in various sensory modalities. Einspruch and Forman (1985) countered that the studies reviewed by Sharpley failed to correctly operationalize the PRS hypothesis. Sharpley (1987) later responded by expanding his review and showing overwhelming evidence of nonsupport for both NLP model and also techniques. He suggested that any theory which is misunderstood in forty-plus studies by numerous authors may well be untestable and meaningless.

Three representative studies illustrate how the concept of PRSs suffers from the same problems of definition and inability to be experimentally verified that have caused researchers to ignore the Meta Model's concept of psycholinguistic deep structure. In these three examples, "key" tenets of NLP have been defined quite differently.

A study by Farmer, Rooney, and Cunningham (1985) presented subjects with pictures, tape recorded sounds, and textural objects that they had to feel. Later, they were asked to recall these stimuli. Subjects were videotaped, and when the tape was played back, subject eye movements were recorded at the point that subjects raised their hands to indicate recall. Farmer et al. reported two major findings. First, the pattern of eye movements to stimuli they found was significantly different from the directions NLP would predict. Second, they noted that visual and auditory modalities have three hypothesized gaze locations each, whereas the kinesthetic modality only has one location, so that one would expect by chance more visual/auditory gazes than kinesthetic gazes. They did a weighted analysis comparing the observed data to a chance pattern (consisting of a 3:3:1 frequency of eye movements) and found that the observed eye movement data did not significantly differ from chance. They suggested that earlier findings of eye movements corresponding to the frequencies predicted by Bandler and Grinder reflected a statistical artifact. Additionally, Bandler and Grinder indicated that the kinesthetic PRS is the most common type, and Farmer et al.'s findings certainly do not support this.

In another study, Wertheim, Habib, and Cumming (1986) examined changes in eye positions occurring during recall of previously memorized visual, auditory, and kinesthetic stimuli. Although they found the predicted pattern of eye movements for visually presented items, they did not find the predicted movements for auditory and kinesthetic items. Furthermore, auditory position eye movements were most common for all recall conditions, including visual item recall (suggesting that perhaps people tend to stare in a particular direction regardless of what type of information they are thinking about).

A study by Wilbur and Roberts-Wilbur (1987) presented films of Carl Rogers' counseling Gloria to subjects, and later had subjects identify as true or false statements made about the film. The statements had been selected to represent information presented via kinesthetic, visual, auditory-tonal, and auditory-digital modalities. They found differences in true/false identification of items depending upon the type of stimulus modality items drawn upon, and concluded that people process information better in some modalities than others. They wrote that they were investigating a "basic tenet" of NLP. However, their study seems far removed from identifying individual differences in PRS or the eye-movement hypothesis, and is at best a fuzzy operationalization of PRSs. All four modality-specific statement groups came from a film, a medium which would inherently predispose subjects to visual representational processing regardless of their preferred representational system.

Sharpley (1984) listed numerous other studies that fail to show any evidence of a PRS or NLP-predicted eye movements. Einspruch and Forman (1985) countered that most of these studies have failed to appropriately operationalize PRSs, and have also failed to look at clinical support for NLP's techniques. The three examples above illustrate Einspruch and Forman's claims: in both confirming and disconfirming studies, the PRS/eye-movement link has been poorly operationalized in widely different ways. The importance of eye movements to demonstrating the existence of PRSs is not agreed upon. Experiments are often sloppy (in two of the above cited studies, eye movement was noted from videotapes and data was only recorded for the time interval just before subjects responded, automatic electronic eye movement recording equipment was not used, and eye movements from several seconds before response, during response, and after response were not recorded). Individual differences in PRSs were not examined. Einspruch and Forman also suggest a problem with a common PRS research paradigm: investigators often look for a subject's preferred representational system by looking at recall of modality-specific stimuli. Thus, most of the studies confound the separate ideas of representational systems (as evidenced by eye movements) and preferred representational systems. Recall that NLP suggests that everyone has a representational system for all sense modalities.

Sharpley (1987) reviewed more forty studies, and countered Einspruch and Forman's arguments by noting that a theory is of little use if so many researchers working for so long cannot even agree on what it is they are researching. The present author would like to suggest that the PRS is a sufficiently "fuzzy" concept that eye movement research cannot offer concrete support for the existence of PRSs.

Sandhu (1991) reported success in determining a subject's PRS with an extensive 52-item instrument which posed structured questions that required the subject to access short term memory. The questions accessed different modalities, and the eye movements made by subjects while they thought about the questions were used to determine their PRS. While Sandhu reported overall significant results (although the size of the subject pool and the specific findings were not discussed), one is still left with the problem that demonstrating a correlation between certain categories of questions and eye movements does not establish the existence of a Primary Representational System. This correlation, even if demonstrated, may be a physiological artifact and is not by itself proof of an elaborate internal cognitive mechanism like a PRS. That is to say, PRSs (like deep structure) may be an unverifiable concept. This conclusion does not mean that PRSs have no value, but that the concept should be taken as a metaphor. Given that Bandler and Grinder advanced NLP as a model, it is curious that so much research effort has gone into proving the accompanying theory. These industrious research efforts have institutionalized ideas of Bandler and Grinder which perhaps were never intended to be part of a formal academic theory.

A Description of NLP Clinical Techniques

While the theory underlying NLP and the Meta Model has not been well supported in the research literature, certain techniques used by neurolinguistic programmers have fared better under empirical validation. Bandler and Grinder and subsequent NLP literature identify many dynamic techniques that, when combined with an understanding of the Meta Model, are said to yield ten minute instant cures, effective social persuasion, and accelerated learning. These techniques include anchoring, reframing, swish pattern, and social influence strategies. These techniques will be briefly described and the relevant research summarized.

Anchoring is a process for attaching a desired emotional state with a specific stimulus, such as pairing relaxation, or confidence, with a physical touch. Anchoring also involves developing the ability to trigger this state while also experiencing an unpleasant memory or situation. A common kinesthetic cue is touching a client's knee. A therapist may have a client imagine an anxiety-provoking situation, and hold one of the client's knees. Then, the therapist will instruct the client in relaxation techniques, and, when the client is relaxed, the therapist will press the other knee. Lastly, the therapist will touch the first knee, and have the client imagine the anxiety-provoking situation while the therapist also triggers the relaxation-anchor (by pressing the other knee).

Reframing involves reconsidering maladaptive behavior as misplaced adaptive behavior, and learning those contexts in which the maladaptive behavior is appropriately placed. The therapist takes a very active role in instructing the client.

Swish pattern is a visualization technique incorporating anchoring in which a client imagines a positive image of self growing and replacing a negative image of self. The therapist might direct the client to imagine a large black square (the current, negative self) shrinking, while a white square emerges (representing the positive self) and grows.

Three part dissociation (also called three part disassociation) is a related visualization technique referring to as dis-associating oneself from past negative feelings or events, anchoring oneself to new positive resources, and then looking again at the negative feelings/events whilst drawing on the new positive resources. This can be very dramatic in practice, involving therapists offering kinesthetic cues for the anchors (e.g., touching of knees) and psychodrama (to relive past trauma in connection with the newly anchored goal-state). Neurolinguistic programmers hold that psychotherapy should be highly directive.

If a neurolinguistic programmer matches a client's preferred representational system by pacing and the appropriate use of language and metaphor, then the intervention should be effective (pacing refers to mirroring a client's posture and behavior). Through workshops, Bandler and Grinder have extended NLP from psychotherapy to effecting social influence, improving persuasive communications, and education enhancement. They have claimed successes in enhancing NLP trainees' interpersonal influence and performance strictly by manipulating their mental representational systems using techniques such as the ones just described (Beyerstein, 1990).

NLP Clinical Techniques Research

Sharpley (1987) has been highly critical of NLP techniques. Based on an extensive literature review of NLP techniques he concluded that they are far from original, and in fact differ little from quasi-hypnotic imaging techniques, psychodrama, certain gestalt techniques, and basic counseling skills such as mirroring. Buchanan and Little (1983) also found similarities between NLP and psychodrama.

Swets and Bjork (1990) reported on a two-year study by a committee of the (United States) National Research Council into a wide range of unconventional human performance enhancements techniques that have been considered by the U.S. Army. The NRC Committee's efforts included a review of neurolinguistic programming (other areas reviewed included hypnotism, meditation, focused concentration, sleep learning, altered mental states, group cohesion, and parapsychological processes). NLP was somewhat narrowly considered in the context of social influence. Research was reviewed, committee members attended a workshop on NLP techniques, and Richard Bandler was interviewed. Swets and Bjork (1990) reported, "The conclusion was that little if any evidence exists either to support NLP's assumptions or to indicate that it is effective as a strategy for social influence" (p. 90).

From the literature, one finds that many larger studies involving control groups have found no success with various NLP techniques in a variety of therapeutic and, particularly, persuasive situations. For example, Dixon et al. (1986) looked at NLP as a persuasive communication technique and found no greater persuasive power to an indirect "resistance evading" NLP message than an informational-only message (placebo), even though a directly persuasive message was more effective. For other examples, see Baddeley (1989), Elich, Thompson, & Miller (1985); Melvin & Miller (1988).

A notable exception to this pattern is a carefully constructed experiment conducted recently by Sandhu, Reeves, and Portes (1993). They demonstrated that neurolinguistic mirroring significantly improved empathy in the relationship between female Caucasian counselors and male Native American adolescents. This finding is of great importance for clinicians, as a strong client-therapist alliance is increasingly regarded as very important for positive therapy outcome. The large number of subjects used (60) and careful experimental controls make this one of the most robust publications supporting an NLP technique.

Articles that use a case study approach have been more uniformly positive in their results, purporting many benefits of NLP techniques in a wide variety of applications (this might be an artifact of editorial selection -- negative case studies being less publishable than negative experiments). In the clinical field, Masters, Rawlins, Rawlins, and Weidner (1991) have reported several case study successes. Likewise, Field (1989) was also very positive about NLP as an adjunct to other hypnotherapeutic interventions.

NLP has also been expanded to other areas. Sandhu (1993) proposed the use of NLP techniques for treatment and relapse prevention of addictive behaviors. Educators and nonclinical professionals also have made case study reports of success using NLP in sometimes exotic applications. Stanton (1989) reported positive outcomes using NLP and single-session reframing-type techniques to improve sport performance. Connel (1984) favorably discussed NLP's application to sales and marketing situations. Beaver (1989) reported five case studies in which NLP techniques were used with children in an educational psychology setting with great success. NLP has even been applied with success in Romania for improving the shooting performance of Olympic marksmen (Holdevici, 1991). Bandler and Grinder have also reported dramatic results in a variety of therapeutic, interpersonal, persuasive, and instructional situations.

Conclusions

The neurolinguistic programming Metal Model and associated theory has not been well supported in the scientific literature. One of the basic Meta Model concepts, communication errors, is essentially descriptive. A second basic concept, deep structure, is undefined and untestable. The third, preferred representation systems (and eye movement correlates and the importance of predicate matching), has either been disproved, or shown to be untestable (depending on one's interpretation). In the words of Beyerstein (1990), "The areas of science that enjoy the greatest prestige at any moment are the most tempting targets for appropriation by pseudoscientists.... Neurolinguistic programming (NLP) is one of many riders on neurology's coattails" (p. 27 and p. 28). Components of NLP's Meta Model (such as deep structure) bear resemblance to other linguistic theories. While the Meta Model is often presented as unique, many of Bandler and Grinder's ideas are a part of -- rather than a break from -- a larger literature (e.g., Bandler, Grinder, & Satir, 1976).

With regard to the techniques, it is important to give credit to Bandler and Grinder for collecting together these techniques under the rubric of NLP. However, as with the Meta Model, it should also be recognized that many of these techniques were not created by them. As Sharpley (1987) wrote:

> NLP may be seen as a partial compendium

> of, rather than as an original contribution to, counseling practice... [If] NLP is presented as a "theory-less" set of procedures gathered from many other approaches to counseling, then it may serve a reference role for therapists who wish to supplement their counseling practice... (p. 106)

The same may well be said for educators and other non-psychologists interested in applying NLP techniques.

Psycho Shaman Effect

The present author adds the following caveat to Sharpley's suggestion: NLP offers a potentially powerful set of tools. While it is clear that the Meta Model cannot be supported, the research verdict on NLP techniques is not conclusive. One must reconcile the null results reported by Sharpley and the NRC with the remarkable successes reported in the case study literature.

An alternative explanation is suggested here to explain the discrepancy between the positive case study outcomes achieved by NLP practitioners and the frequently lackluster results of experimental researchers. This alternative will be termed the "psycho shaman effect." Like NLP techniques, the psycho shaman effect is a collection of already-existing, well understood and accepted ideas.

Specifically, three components are proposed: cognitive dissonance, placebo effect, and therapist charisma.

First, the psycho shaman effect includes cognitive dissonance (Festinger, 1957). Most clients of successful neurolinguistic programmers probably have considerable cognitive dissonance which would lead to a desire to change. Many of the positive case study reports were made by clinical psychologists applying NLP on paying clients in private practice. Much research into NLP techniques has involved experimental psychology subjects who have often received compensation for participating in a study. Successful outcomes of NLP workshop participants also correlates with financial commitment on the part of the trainees.

Second, the psycho shaman effect includes a place for the placebo and Hawthorne effects of therapy, performance enhancement training, accelerated learning programs, and the like. Case study articles do not tend to be written about clients for whom a therapy was unsuccessful -- and successful case study outcomes may represent those clients who most believed in the power of the therapist, rather than proving the efficacy of a technique. Third, the psycho shaman effect is strongest when the practitioner or educator is charismatic. Willner (1984) wrote extensively about the importance of charisma in the power of unusually compelling historical figures, dictators, and political leaders. Similarly, a particularly charismatic psychologist, counselor, or educator may greatly increase the placebo effect. One might expect to see an interaction of such characteristics as drama and stage presence with any cognitive dissonance, thus resulting in a powerful force for a positive outcome, regardless of the technique the practitioner is utilizing.

It is suggested that the successful outcomes reported by professionals utilizing the techniques of NLP may be a result of the psycho shaman effect. Does this mean that NLP and in particular NLP techniques are without inherent value? Not in the least! For clinicians, educators, and persons interested in enhancing human performance, a successful, lasting outcome is of great value, even if it is "only" a manifestation of the psycho shaman effect. A comparison can be drawn to the work of Franz Anton Mesmer and Elisha Perkins. In 1774, Mesmer found that patients treated with magnets got better. He developed a theory of Animal Magnetism which was advanced in the United States in the late 1790's by Elisha Perkins. After a time the theory was debunked by the medical community and the outcomes discounted

(Quen, 1975). I do not mean to belittle NLP or its advocates by this comparison. Quite to the contrary, Mesmer's outcomes were often far superior to his contemporary conventional practitioners. The established scientific community of Mesmer's time missed a chance to investigate and capitalize on what may have been the first documented occurrence of the psycho shaman effect in modern times.

It may well be that Bandler and Grinder's reported successes have not been exaggerated after all. Indeed, precisely because of the claims of "5-minute cures" and other miraculous outcomes of practitioners, NLP deserves a much greater research effort from university academicians than it has yet received. However, researchers should look beyond NLP's model and even beyond specific NLP techniques, and instead delve further into the psycho shaman effect while working in partnership with the most accomplished and successful practicing neurolinguistic programmers.

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Resumen. La Programmación Neuro-Lingüistica (PNL) es ambo un modelo con una collección de técnicas y un dicotomía entre la teoría y la práctica de PNL. La utilidad de técnicas PNL pretendidas se encuentra en marcado a la escasez de soporte científico por el marco fundamental teorético y la eficacia de las mismas técnicas. Este artículo integrativo considera PLN del punto de vista de la psicología experimental clínica. Se discuten las cuestiones y un efecto "curandero" se propone como una explicación alternativa de los efectos.

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School Stress and the Theatre

by
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Abstract. The present study examines the applicability of Bandler's (1985) theatre technique for alleviating phobic states to the reduction of school related stress in eighth grade students. 30 students, selected at random from 137 eighth grade students enrolled in a middle-class high school, were administered the Student Stress Inventory and paired on the basis of their scores. One member of each pair was allocated, at random, to either an Experimental or Control group. During the first stage of the study, this latter group had no treatment. However, during the second stage, they received the same training as that experienced by the Experimental group, thus acting as their own controls. Results from both stages indicate that students were able to reduce their school-related stress and to maintain this lower level over the follow-up period of six months and three months respectively.

*** *** ***

Introduction. When the word "stress" is used it usually carries with it a distinctly negative connotation. However, the term may be used in a more neutral sense (Selye 1974), being defined negatively as "dis-tress" or positively as "eustress". The former is the stress of losing, of coping poorly with the environment, while the latter is the stress of winning, of meeting and overcoming problems posed by the environment. In an educational context, the school situation is, for many students, one of distress (Dobson,1980) in that they find it difficult to cope with teachers, rules and discipline, choice of subjects studied, and pressure of academic work.

Coping in school can be difficult because students usually perceive distress as residing totally in environmental events. However, if stress is conceptualized as interactionist in nature (Coleman, 1978), it is possible to teach students to respond more positively to the demands placed upon them. They can be shown that stress in not purely the outcome of environmental events but is, to a large extent, a function of the way in which they choose to perceive these events (Houston,1979). One way of doing so is through the use of imagery.

Habeck and Sheikh (1984) have pointed out that imagery has progressively supplanted verbal procedures in the treatment of many disorders, including stress, primarily because it permits patients to enter more fully into the therapeutic experience. Words often introduce an element of distortion because they are not equivalent to experience and are, accordingly, less therapeutically useful . In addition, imagery and actual stimuli are seen as being functionally equivalent, this being the crucial aspect of its power to create therapeutic change (Habeck and Sheikh,1984). Imagery permits not only the guided or spontaneous creation of experience, but also facilitates the vivid storage and recall of significant events. As Singer (1979) has pointed out, patients who have mental images available for repeated reference tend to concentrate better and are more likely to maintain intense affective responses . Like real experiences, mental images are simultaneous, thus they tend to elicit deep emotion more readily than do verbally censored descriptions of affect.

Bandler (1985) has made considerable use of the power of mental imagery in helping patients to quickly overcome their problems. One particularly effective approach is the theatre technique which draws heavily upon imagery and disassociation. It comprises the following steps.

(i) Patients are 'to imagine that they are sitting in the middle of a movie theatre. On the screen before them, they are to see a black-and-white snapshot of themselves in a situation just before they had the particular phobic response.

(ii) Patients then float out of their bodies up to the projection booth of the theatre, where they can "watch themselves watching themselves." From that position they are able to see themselves sitting in the middle of the theatre, and also see themselves in the still picture which is on the screen.

(iii) That snapshot up on the screen is then transformed into a black- and-white movie, which is to be watched from the beginning until just beyond the end of the unpleasant experience.

(iv) When patients get to this end point, they are to stop the movie, make it into a slide, turn it into colour, then jump inside the picture and run the movie backwards, taking only 1-2 seconds to do so. Everything is to take place in reverse with people walking and talking backwards.

Bandler argues that while the brain learns fear instantly, it also can learn, instantly, that it is no longer necessary to be fearful. Because the initially frightening experience looks so ludicrous when visualized in reverse, patients usually lose their phobic response. However, though Bandler suggests the theatre technique be used primarily with phobic patients, its applicability is far wider than this. It may be applied, with pleasing results, to many other problems areas, one of these being stress.

Perhaps the greatest virtue of Bandler's technique is that events previously considered as frightening and distressful are presented as ludicrous. As students change their perceptions in this way, they come to a realization that they have more control over their thoughts, and, ultimately, over their lives, than they had previously thought possible. Fortunately this realization is relatively easy to attain as the technique is easily learnt by students of all age levels though, in the study to be described, its use was restricted to High School students with an average age of 13 years.

Students of this age level were chosen to enable legitimate use of the Children's version of the Student Stress Inventory (Metcalfe, Dobson, Cook, & Michaud, 1982), a 40-item instrument designed to measure childrens' school-related stress. It was developed by asking 13 year-old English boys and girls which aspects of their school lives they perceived as sources of unpleasantness, worry, and difficulty, the focus being exclusively upon the school environment with no consideration being given to events occurring in their "outside" lives. Some typical items are listed below.

2. older children bully young ones.
12. teachers who are too strict.
24. losing friends on transfer to upper school.
30. being ridiculed for poor work.
37. consequences of letting down my parents.

Students reported on the amount of stress each item generated by choosing a response from the following 4 point scale:

0 no stress at all
1 slight stress
2 a lot of stress
3 extreme stress

A single stress level score is derived from these responses, no attempt having been made by the authors to provide further analysis in the form of sub-scales. Data on internal reliability (r = 0.90) and convergent validity, based on significant positive correlations with a variety of anxiety scores, motivation scales, and locus of control, would appear to be quite satisfactory, supporting the use of the Student Stress Inventory in the present study.

The Study

The purpose of the study was to investigate the possibility of extending Bandler's phobia treatment technique to the alleviation of stress among eighth graders. Under test was the hypothesis that, after exposure to the theatre technique, student stress level, operationalized as Student Stress Inventory scores, would be lower than it was before such exposure.

- **Stage 1.**

Subjects were 30, eighth graders (15 boys, 15 girls) drawn from a predominantly middle-class high school. These students, selected at random from 137 eighth graders enrolled in the school, were administered the Student Stress Inventory. Students were paired on the basis of similar scores and, wherever possible, on sex. One member of each pair was assigned, at random, to either the Experimental group (7 boys, 8 girls), or the Control group (8 boys,7 girls).

The Control group had no treatment during the first stage of the study which had a duration of approximately seven months. However, the week after its conclusion, they received the same training session as that experienced by the Experimental group. Thus, in this second stage of the study, they acted as their own controls.

The Experimental group met with the present author on three occasions, these sessions being spaced one week apart. The initial session, occupying 60 minutes, involved explaining Bandler's theatre technique, demonstrating with several students how it might be used to eliminate the distressful aspects of various experiences, describing examples of how other students had been helped, and taking all students through the procedure as a group.

One example which appealed to many of the eighth graders involved a student who had broken his arm playing football.

Although this 12 year-old boy, Peter, usually become quite upset when thinking about the accident, using the double dissociation of visualising himself in the audience and in the projection box enabled him to view the experience in a rather detached way, without the extremely unpleasant feelings it had previously evoked. This sense of remoteness helped him modify the fear that he had previously associated with the situation. Visualising the initially frightening incident in the somewhat ludicrous running backwards mode seemed to achieve an alteration of Peter's mental perspective, a draining away of negative emotion.

Bandler(1985) has argued that the human brain learns fear instantly from incidents such as Peter's accident. This fear is initially protective in that it keeps people away from the situations in which they had been damaged. Unfortunately, it can then become overly restrictive, drastically interfering with peoples' lives. In Peter's case, after his recovery, he became frightened of playing any sport at all and was quite fearful about any form of interaction with other children.

However, if the brain can be shown that the incident need no longer be feared, that it could be seen as funny, it can relinquish the fear. Whether this view of Bandler's has any truth or not, the actual technique is remarkably effective in helping people let go of anxieties which may have mentally crippled them for years.

So Peter imagined himself entering the theatre, sitting down, and seeing himself on the screen just before he was involved in the episode which had proved so traumatic for him. At this point he was looking at himself playing football, feeling quite pleased with the standard of his play. After mentally floating up to the projection box, he was then able to look down and simultaneously see himself and this black-and-white slide on the screen.

Peter then ran the black-and-white movie of the accident in which his arm had been broken, stopping it as a slide at the point when he felt reasonably comfortable once again. This was several hours after the game had been completed. Mentally he then entered the picture of himself on the screen, turned it into colour, and ran it backwards as a movie, stopping at the starting point. All the players ran backwards, their kicks went in the opposite direction, and their tackles looked quite ridiculous. Peter also put funny noses and ears on the players and added a humourous sound track. In other words, he made the whole thing ludicrious. When I asked him to think again of the traumatic episode, he was able to do so without the strong emotion which had characterised his earlier recall.

Following this intial introduction, sessions two and three were of 30 minutes duration, these being devoted to feedback and encouragement. Students discussed the application of the Bandler technique to their own lives in terms of how they had used it over the previous week, receiving support and suggestions from their fellow students and from the experimenter. They were encouraged to each day use the technique as a means of "defusing" any situation which was causing them distress.

One week after this session, the Student Stress Inventory was re-administered to both Experimental and Control groups. A further administration of the scale took place six months later when students also completed an Anecdotal Report relating their feelings and reactions about the experiment.

- **Stage 2.**

Once the six-month follow up had been completed, Control group subjects experienced the same training sessions, as had the Experimental group. They, too, completed the Inventory twice more, the first occasion a week after the end of the treatment and the second three months later. Thus both Experimental and Control groups took the inventory on three occasions. At the time of the three month follow up, they also completed an Anecdotal Report.

Table 1 presents data derived from three administrations of the Student Stress Inventory. An item response analysis revealed no significant difference between boys and girls in terms of the sources of stress that they identified. Nor was a sex difference in terms of total Inventory scores apparent. Accordingly, the data for both sexes are combined.

Table 1. Mean scores and standard deviations for two groups of 13 year old students on the Student Stress Inventory (Children's version) administered before, immediately after, and six months after learning the theatre technique (n = 30)

Group	Before	After	Six months
Experimental			
Mean	63.9	56.4	55.8
S.D.	11.7	10.9	11.6
Control			
Mean	64.3	63.4	63.8
S.D.	11.4	10.5	11.4

Note: High scores indicate high levels of stress, maximum = 120.

A repeated measures analysis of variance reveals that a highly significant difference exists between Experimental and Control groups (F=7.61, df=5, p=.0001). When the two groups are compared on the basis of their immediate after treatment scores, the stress level of the former is significantly lower than that of the latter (Scheffé F=2.6, p<.05). This lower stress level of the Experimental group, operationalized in terms of Student Stress Inventory scores, was maintained during the six months follow-up period (Scheffé F=3.01, p<.05).

The stress level of the Control group showed no reduction either immediately after the treatment sessions or at the six month follow up. However, the Experimental group showed significant improvement on both testing occasions (Scheffé F=2.61, p<.05: and Scheffé F=3.09, p<.05) respectively.

Stage 2.

Table 2, sets out data pertaining to the second phase of the study when Control group students experienced the three training sessions. Again, data for boys and girls are combined.

Table 2. Mean scores and standard deviations for one group of 13 year old students on the Student Stress Inventory (Children's version) administered before, immediately after, and three months after learning the theatre technique (n = 15)

Group	Before	After	Three months
Control			
Mean	63.8	54.1	53.7
S.D.	11.4	11.1	11.9

Note: high scores indicate high levels of stress, maximum = 120.

As in the first stage, the same stress reduction pattern is discernable (F=11.09, df=2, p=.0001). The improvement of the Control group both immediately after treatment (Scheffé F=7.97, p<.01) and at the three month follow up (Scheffé F=8.65, p<.01) is quite marked. Comparison of Tables 1 and 2 indicates that this improvement is similar to that recorded by the Experimental group.

Discussion

These results indicate that the theatre technique is likely to reduce stress in eighth grade students. Both the Experimental group in the first stage of the study, and the Control group in the second stage, were able to significantly reduce their stress level. Although for the majority of the students, their initial level of stress was moderate rather than extreme, mean scores were comparable to those recorded by the English sample.

Their Anecdotal Reports were quite revealing. These reports were analyzed primarily in terms of subjects' opinions as to the effectiveness or ineffectiveness of the treatment, a simple count of positive versus negative comments being made. The overwhelming impression left by these reports was very favourable, indicating that most of the eighth graders appreciated that they had been taught a technique enabling them to reduce the pressures they had been experiencing in their school lives. This appreciation was reflected in the fact that approximately 70% of them claim to have continued using the technique after they had completed the three week treatment.

Particularly pleasing was the finding that this reduction was maintained over the follow-up periods of six months for the Experimental group and three months for the Control group. The Anecdotal Reports of those students claiming continued use of the theatre technique after completion of the three week treatment indicated that they derived considerable enjoyment from the experience, believing it improved their capability to manage their lives more effectively.

Perhaps the theatre technique training acted as a catalyst, demonstrating to the students their ability to handle distressing incidents more effectively than they had originally thought possible. In itself, this realization may have been sufficient to maintain stress at the lower level. However, the relative brevity of the follow-up may have allowed insufficient time for differences to be revealed between students who continued to use the theatre technique and those who did not.

Students who made no further use of the theatre technique tended to experience higher stress levels than those who practiced regularly, although this difference did not reach statistical significance. Thus, it would appear from this finding that three treatment sessions, even when unsupported by further practice of the technique, were able to achieve a marked reduction is the students' stress level as defined by their scores on the Student Stress Inventory.

If it can be accepted that the Inventory is a reasonably accurate reflection of students' stress level, the present study suggests that two hours spent in learning and practicing the theatre technique are sufficient to effect a reduction in this level .

During the planning stages of the study, it was anticipated that sex differences would emerge. Accordingly, equal numbers of boys and girls were included. Also, as far as possible, matching between groups was done on a sex basis. However, analysis of the data showed no evidence of any difference between boys and girls, either immediately after the three sessions or after the three or six .month, follow-up period.

The theatre technique method is extremely simple. That is one of its great virtues when applied to children. They learn it very quickly and, according to the Anecdotal Reports, most of them enjoy using the technique, not only at school, but in all aspects of their lives where they feel under pressure. Particularly pleasing to most of the students was the realization that it is the way they choose to think about events, rather than the events themselves, which generate their feelings of distress. Thus, by taking more control over their perceptions, they were able to also take more control of their lives.

Before exposure to the theatre technique, many of the students who took part in the study felt there was nothing they could do about events which bothered them. Criticisms from teachers, insults from other students, and problems with learning were regarded with fatalism. Nothing could be done about these. They had to be endured. Yet, three short sessions of learning an imagery technique enabled most of these children to significantly reduce their distress. Such an outcome would suggest that Bandler's technique is one that deserves further exploration as a means of helping students to more fully enjoy their school lives.

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Resumen. Este estudio examinó la aplicabilidad de la técnica del teatro de

Bandler (1985) por el aliviar la fobia a la reducción de tensión en escuela con alumnos en el octavo grado. Se administró el Inventario de Tensión Escolar a 30 alumnos selecionados al azar de 137 alumnos en un colegio de clase media y se hizaron parejas por las puntuaciones. Se asignó al azar un miembro de cada par al grupo experimental o controlo. En el primer escenario este segundo grupo no tuvo no tratamiento. Sin embargo, en el segundo escenario recibieron el mismo tratamiento como el grupo experimental originalmente, así actuando como sus propios controlos. Las resultas de ambos escenarios indicaron que los alumnos pudieron reducir la tensión escolar y mantener este bajado nivel por los siguientes seis y tres meses respectivamente.

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Methodological Considerations in Multicultural Research

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Abstract. The culture in which learning occurs is an important variable to consider, but one largely neglected in research. Increased attention to culture as a variable is needed to circumvent frequent errors of the past. Theoretical models and methodology are reviewed for examining and specifying how culture affects the individual.

* * *   * * *   * * *

One important concern in special education has been focused on the representation of some groups of minority students in various special education placements. Although much work in this area has focused on searching for non biased assessment tools and procedures, and on examining placement rates for equitable representation, concern has begun to shift to a more sophisticated level of analysis. Specifically, culture has come to be recognized as more than an **independent** variable used for grouping students for research purposes. More and more attention is being paid to examining culture as a **dependent** variable, something to be studied in its own right. Moreover, increasing attention is being paid to the process by which culture mediates activity and interaction in school-based settings.

A Note on Diversity. It is likely that the concern with cultural processes in education will increase rather than decrease, primarily due to the demographic changes taking place in many areas. As in many areas of the country, cultural and linguistic diversity is a major variable to consider in education. Moreover, superimposed on this increasing diversity is declining academic achievement, with one consequence being increased use of special education services (Rueda, 1991).

Cultural Analysis in Special Education Research: The Role of Guiding Theoretical Models Although culture and its impact on educational processes has long been a topic of investigation in general education (see, for example, Trueba, Guthrie, and Au, 1981), it has remained largely ignored in special education. What is the explanation for this?

One possible reason is rooted in the predominant paradigms or models which are used to guide research and practice in the field. For example, Table 1 (from Poplin, 1988) illustrates the most well-known of these within one of the largest categorical designation at present, learning disabilities.

It is clear that for the most part culture and cultural analysis do not form a part of the universe embraced by these models. For the most part, psychology has formed the root discipline of special educa-tion research, with a traditional emphasis on experimental control and the development and testing of causal relationships. Neurological pathways, psychological processes, specific academic behaviors, and information processing strategies do not rely on culture as a mediating variable in accounting for behavioral differences between individuals. Given the diminished role of cultural analysis in the traditional models used to formulate our research questions, base our assumptions, and construct our methodological tools, it is easy to see how culture has not played an important role in special education research. At best, this has led to research which fails to account for the role of culturally based practices and understandings on educational processes and activities from referral, to assessment, to placement, to instruction. At worst, it has led to a situation in which differences are treated as deficits which are then hypothesized to account for diminished academic achievement and learning handicaps.

Table 1. Theoretical Perspectives on Special Education Assessment 1950-present (Adapted from Poplin, 1988)

p.1/3

	Medical Model (1950'S)	Psychological Process Model (1960'S)	Behavioral Model (1970'S)	Piagetian Model (1970'S)	Cog./Learning Strategies Model (1980'S)	Construct./Interact. Model (1990'S)
Emphasis	Neurological pathways	Prequisite skills for academic success	Academic product or consequent behavior	Universal developmental stages	Info.processing metacognition necessary for acad.success	Sociocultural processes in learning; context or activity settings
Etiology	Brain damage or dysfunction	Minimal neurological dysfunction	Lack of learned behaviors or learned non-adaptive behaviors	Developmental lag	Insuff.strategies or study skills to process info for school success	Inapprop.or absent mediation

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(Table 1, cont.)

p.2/3

Diagnosis	Largely neurological	Soft neurological signs, psychological process testing; some intelligence and academic tests, or modality frame of reference	Discrepancy between IQ and ach., criterion referenced tests, and observation of specific academic and social school tasks	Comparison to universal developmental stages	Discrepancy between IQ and acad. achievement, with cogni. skills tests or observation of specific strategies	Highly individual or not considered relevant (no specific categories); checklists, interviews
Assessment	Academic assessment, largely anecdotal case studies	Psychological process; some basic academic skills; standardized psychometric tests	Testing of behavior against task analysis skills; reinforcement contingencies; CRT's	Clinical observation or specific problem solving tasks	Comparing behavior and processing against known strategies used by successful learners	Observation of behavior on authentic tasks with and without mediation

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(Table 1, conc.)

Instruction	Extremely structured, clutter-free environment; motoric and other neurological training; some basic skill emphasis; some medication	Psychological or psycholinguistic training w. less empasis on actual academic skills;medication, sensory integration, and or modality training	Direct instrction using task analysis of skills (behaviors) and application of reinforcement principles	Developmental cognitve tasks	Direct inst. in strategies used by successful learners; use of principles of reinforcement, partic. self-management and self-talk	Meaning-based instruction on authentic tasks; attention to background "funds of knowledge"; active role of student
Some Major Figures	Werner, Strauss, Lehtinen, Cruickshank	Kirk, Frostig, Kephart, Barsch, Wepman	Lovitt, Carnine, Jenkins, Haring	Piaget, DeAvila	Torgesen, Deshler, Swanson, Wong	Vygotsky, Goodman & Goodman, Poplin, Ruiz

As various researchers have come to realize the shortcomings of prevailing models in this respect, some have begun to explore alternative theoretical models. In the area of learning and instruction, for example, Vygotsky's socio-historical framework has gained increasing attention, with its emphasis on understanding the cultural underpinnings of the development of thinking and learning in everyday contexts (Laboratory of Comparative Human Cognition, 1983; Minick, 1986; Rogoff & Lave, 1984; Wertsch, 1985a, 1985b). Belmont (1989) has provided an excellent discussion of the integration Vygotsky's work with more traditional cognitive work on memory and strategy instruction.

Disciplinary and Methodological Considerations. Traditionally, psychology has formed the root discipline of special education research, with a traditional emphasis on experimental control, reliability, and the development and testing of causal relationships. Culture, where acknowledged, has tended to be treated as a grouping variable, with ethnicity used as a proxy measure. With the increasing concern with cultural processes in education, many researchers have become disenchanted with the limitations imposed by relying on a single discipline. Not surprisingly, some investigators interested in cultural processes have looked to the insights provided by other disciplines such as sociology and anthropology. Anthropology in particular has gained favor because of its central concern with cultural processes and the emphasis on the validity of research findings for particular local cultural contexts.

Because of its concern with cultural processes, anthropological research has come to rely on methods which are unfamiliar to many special educators, namely various forms of what can be called qualitative research. This should not be confused with observational or naturalistic research. Qualitative research emphasizes trying to understand the meaning of a particular activity, event or artifact from the perspective of its participants. Although there is a great deal of variability in the methodological tools which fall under this designation, all are concerned with the participant's culturally based understandings of a particular event, activity, or context, and how these come to be constructed based on their interaction in that setting. For example, what is the meaning of the label "learning disabled" to a **particular** child, as opposed to a group-administered quantifiable index of stigma? Well known examples of qualitative methodology in special education research are Edgerton's study of newly released institutionalized mentally retarded adults, and Mehan et al's study of special education referral and assessment in a single school district.

Although this methodology is beginning to find its way into special education research (Stainback & Stainback, 1988), and holds some promise for integrating the study of culture into the context of learning problems, its use is not free of controversy. The fundamental differences in basic assumptions which have launched heated debates among researchers in the larger field of educational research have trickled into the special education research arena as well (see for example, Heshusius, 1989).

Unpackaging Culture. Although the theoretical and methodological decisions facing researchers interested in cultural processes are formidable, a common yet difficult issue is how to characterize culture as a variable. Stated simply, the problem is avoiding the danger of unwarranted assumption of homogeneity of experience of children within cultures, or assuming that all children in a given cultural group have common natal experiences. This is an important yet difficult point, since it impacts the research process at all points from subject selection to generalization of results. A common methodological error is to measure culture as a stable and fixed **trait** (or nominal variable such as sex or height) for all subjects in a group, thereby assuming that culture has uniform effects on every child. A related methodological error is found in the practice of treating nationality or ethnicity as the equivalent of a common cultural experience within a given group. As Weisner, Gallimore, and Jordan (1988) point out, cultural analysis must have the capacity to move between data on individuals and particulars, to summaries of shared patterns for behavior in the form of traits, beliefs, and customs.

Weisner et al have suggested a promising way of addressing this problem, i.e., moving between the individual and group levels of analysis. Primarily, this involves construing culture as a **shaper of activity settings**, or contexts for individual action, teaching, learning, and task competence, and permits the identification of ways in which culture specifically affects the learning of individual children in a variety of contexts.

Identifying the effects larger cultural processes on individuals involves the "unpackaging" of culture (Whiting, 1976). This involves observing and identifying at least the following elements:

1. The **personnel** present who teach and influence children; their availability

in activities throughout the child's daily routine.

2. The **motivations** of the actors.
3. **Cultural scripts for conduct** commonly used by participants in teaching/learning contexts that arise in natal cultural and school settings.
4. The nature of **tasks and activities in the daily routine**, and the frequency and distribution of their performance.
5. The **cultural goals and beliefs** of those present in the activity setting.

By taking these factors into account, the researcher is able to document how cultural level factors impact the individual or family, thereby allowing mobility between the individual and cultural levels of analysis. The novelty of this approach can be gauged by imagining how different, for example, psychometrically-based research on assessment might look were it to incorporate these factors.

Final Thoughts. At the theoretical level, it appears that the role of culture has not been a central concern with respect to learning problems within the field of special education, and that increased attention to the parameters of established models of research and practice in this respect is called for. At the same time, researchers interested in culture are beginning to explore alternative theoretical models and methodologies which permit moving past treating culture as a relatively homogenous independent variable.

Since the treatment of culture is fraught with the opportunity for methodological and conceptual errors and shortcomings, special attention is called for in research in which culture plays a central role. One promising approach is found in trying to examine the constituent elements of cultural practice and attempting to specify how the larger social processes impact the individual.

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Resumen. La cultura en la cual se pasa el aprendizaje es una variable importante que tomar en cuenta, pero una que se incomplimienta por lo general en investigación.

Atención aumentada a la cultura como una variable es necesaria para circunvenir errores frequentes del pasado. Modelos teoréticos y metodología se repasan para el examinar y el precisar como la cultura afecta el individuo.

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The Atmosphere Factor

by

Rosella R. Wallace

Abstract. Having experienced a suggestopedic classroom for herself, the author explored the physical and psychological factors that lead to establishing a suggestive positive atmosphere conducive to learning. The results in her own classroom are discussed here.

Introduction. After experiencing an *environment effect* on my own learning ability during a Lozanov training course, I launched an informal classroom-based research on that elusive quality I call the *atmosphere factor*. Could it influence learning in any classroom (including home) for all ages?

In this story, I share my thoughts, observations, and an *anticipatory set for the day*. This simple opening *suggestive ritual* invites students of all ages to experience optimum learning.

Not an Ordinary Classroom.

Buckminster Fuller said, "If you change the environment, you change the people." I invite you to step back in time and join me as I entered a Lozanov class on a May morning in 1987. I walked into a very different environment from that which most seasoned students associate with a classroom. This special learning space and seminar was designed to introduce me and my fellow students to the Lozanov Learning Method.

The first sounds that I hear are the lilting strains of beautiful classical music playing softly. A dozen people sit in comfortable reading chairs in a semi-circle around the teacher. Behind her are the twin speakers of a large stereo music center. The room is carpeted in a soft green carpet that gives a sense of quiet dignity and comfort to the room. The air smells sweet from the fresh-cut flowers on the table at the front. A sheer curtain blows softly, stirred by the breeze. Sparkling clean windows let in an abundance of natural light. The pastel-colored walls are accented with beautifully framed works of art.

As I settle down, comforting support for my arms and head seems to offer itself. It's as if the chair is saying, "Here, allow me to serve you. I am here for your enjoyment." The atmosphere is calm and inviting, yet charged with anticipation. It is evident that the room has been prepared and that the teacher is ready to begin. Her papers are neatly piled awaiting distribution. Flip charts stand at attention. Colored markers are eager and ready.

All of the cares of getting here on time, the traffic, and the tuition cost seem to drop from my body like a loose jacket, leaving me free to savor and enjoy the surroundings. I marvel at my state of mind that is alert and yet at the same time relaxed. The teacher smiles and says, "Welcome to the Lozanov Method Class. In this class you will experience optimum learning. Rejoice!"

Back to the Real World.

This firsthand experience made me realize the importance of classroom environment in terms of learning outcomes. When I returned home to take up where I had left off as an elementary teacher, I was determined to give my students a *special* classroom. Employed in a typical school district with cost overruns and budget cuts, it was useless to wish for a rug, curtains or a twin-speaker stereo system. As teachers, we take what we have, and do the best we can. I could count on help from my students to improve *their* room.

I described the extraordinary class I had attended and how the room seemed to help me learn. We acknowledged that our room was already special. It was clean and bright, decorated with plants and book cases. But how could we make it even better? Amy, the efficiency expert, thought that it would be good to know where all the supplies could be found. Everyone agreed. A cardboard unit with labeled drawers met our needs. Here is where the scissors, paper, colored markers, glue sticks and pencils would live. Now they have their own address. This follow-up on students' suggestions fostered a sense of ownership and pride. "These markers (or scissors) want to go back to their home," was our schoolroom joke.

I don't mean to imply that our classroom never got messy. Far from it! Hands-on projects abounded. Interesting items picked up on the way to school like eagle feathers, fossils, or abandoned birds' nests were on display. Pieces of art work and science projects in progress were left out to be finished later or observed.

The *specialness* was most apparent in the morning as the children arrived. My plans included an "anticipatory set" for the day. Before the school day started, I filled my potpourri pot and turned on the cassette player. A light bouquet lingered in the air. The cadence of lively classical music cheerfully filled the room.

Most important, I was standing at the door with a smile on my face while inviting the students into a safe and special place. "Good Morning. Lucky that you're here today! We will be learning about exciting things and having fun." An aura of *specialness* created by the music and pleasant aroma conveyed a message. "Your teacher cares about you." Students responded with comments such as, "Mmmm, it smells nice in here." The air fairly crackled with anticipation.

Printed in big letters on a brightly-colored poster at the front of the room, was our class motto: EVERY DAY AND IN EVERY WAY, I AM GETTING BETTER AND BETTER. Reciting our motto orally each morning was as routine and reverent as the pledge to the flag. Again after lunch, we repeated the motto together, affirming success for our afternoon session. The atmosphere must be nurturing. I *suggested*, *expected*, and *affirmed* that learning would be accelerated, that memory would be enhanced, and that ALL of the students would succeed. This proved to be the case.

Different Schools and Different Classrooms.

Years later, while teaching university education courses, I addressed the powerful effect of the *atmosphere* in that Lozanov class. My fellow students and I did indeed experience optimal learning. The milieu was a contributing factor. I attempt to describe that elusive element that I have dubbed the "atmosphere factor."

The unique ambience *suggested* that the Lozanov class would be exceptional. As students, we were told by a knowledgeable teacher (who had her act together) that we would experience optimal learning. We *expected* to, so we did. Our brain accepted (or was prompted to remember) the forgotten truth that we could learn quickly and easily without strain or coercion. This caring teacher knew that removing stress would allow us to bypass the learning blocks that had limited us in the past like, "no pain, no gain."

The instructor must be credible, believe in the method and believe that students will succeed. Students must believe that the instructor is trustworthy and knowledgeable or they will not accept that they have untapped potential.

I share ideas with future teachers and retell my true-life stories. As a teacher/researcher, I discovered first hand that *exceptionalizing* a public school classroom leads to immeasurable rewards. I show teachers the motto poster, explaining that by verbalizing this message twice a day, we convinced and reminded the subconscious mind of our continual progress. Affirmations sink into the subconscious mind and become a part of our belief system. Eventually they will replace the learning blocks.

Classroom-based research validated my hypothesis that if children *expect* learning to be exciting and if the teacher *expects* that they will ALL succeed, it will happen. The *anticipatory set* for the day was the catalyst. The class motto, "Every day and in every way, I am getting better and better," and "Learning is fun and easy for me," were two of our affirmations.

I share my results with aspiring and veteran teachers, hoping to inspire them to become classroom-based researchers. Too few education text books mention this excellent opportunity. Not enough teachers realize that there are methods and techniques that can energize and improve their lessons and their students, just waiting to be tried or DISCOVERED. It is an important part of supporting the paradigm shift in education.

Coming from this background, I am an *atmosphere factor sleuth.* Presently, I visit many classrooms at all levels. Sleuthing and observing are second nature. The observations that follow are not to criticize. They are offered with genuine intentions, to create an awareness rather than chide. My respect for teachers is surpassed only by a desire to help and encourage them. I appreciate that I am in an ideal position to work toward that goal.

My position as Student Teacher Supervisor is one of my favorites. I observe practice teachers regularly in those magical places called classrooms. Unannounced, I slip in quietly and sit like a little mouse in the corner. As the semester progresses, my random visits become routine and I am scarcely noticed. The environment of a classroom envelopes me. The aroma of crayons, chalk, and lunches in brown bags, mingle with pizza (one of the hot lunch choices being prepared in the cafeteria). These are the ordinary school smells that we expect in an average classroom.

Conversely, on rare occasions, the aromas are not always pleasant A student forgot to dispose of a brown lunch bag. A half-eaten tuna fish sandwich mingles with the odor of soured milk. Sweaty tennis shoes waiting to be used during P.E. class are sending out their stench. Occasionally teachers complain of the stink, but they get used to it or accept it as a cross they must bear.

In contrast, teachers that realize the importance of classroom atmosphere take time to tend to details that affect the classroom scent. The difference is notable. While complimenting these odor-awareness experts, I ask what manner of purge accomplishes this *absence* of bad smells.

They explain that it doesn't take much time for the student monitors that are on *Official Sniffer Duty* to check the shelf for forgotten lunch bags. When a pair of tennis shoes need to be washed, the *Official Sniffers* simply leave a reminder (cut in the shape of a tennis shoe) on the owner's desk. The safe, comfortable smells of the average classroom I mentioned earlier permeate the air. Then, there is the above average.

Occasionally, I enter a classroom that sings out with consideration comparable to the Lozanov classroom. The sparkling windows reflect the plants on the sills. As I inhale the invigorating bouquet of freshness in the unpolluted air, I instantly sense that this room is distinctive.

Busy students working in groups are engrossed in projects. Their excitement and the essence of the Lozanov classroom surrounds me. I sense that this environment was carefully prepared and ready when the students arrived. The nurturing quality, difficult to describe, but recognizable to an *atmosphere factor sleuth*, is evident. Just exactly what are the components? Is there a cookbook approach? Certainly it involves much more than good smells, affirmation posters and music when the students enter.

I cannot create a concise component list or recipe. Like a delectable stew, it has many ingredients and each combination is unique. The main component is a genuine caring quality of the teacher, enhanced with contagious enthusiasm. A willingness to try new things and be open to new ideas adds the zip that leads to variety.

Variety is the spice that adds to life. Belief in each child's potential gives it zest. Providing reflection time and giving students permission to savor the joyful process involved in learning is integral, the savory base. All of this and more enters into the flavor of the atmosphere factor. Just as the quality of the stew depends on the cook, the atmosphere factor depends solely on the instructor. Yes, you could say the *atmosphere factor* nourishes learning. It is *soul food* for the brain.

Conditions are Not Always Ideal.

I can hear the secondary and college teachers saying, "This is great if you teach in the same room all day and all year. What about the teachers who share a room or move around from one room to another for different classes?" Teaching at the college level, I am assigned a room for each class I present, seldom the same one. Classes are spaced 15 minutes apart. By the time the previous class leaves, I have five minutes before my class begins. High School teachers face this same situation.

When possible arrange the chairs or desks in a 'U' shape design or small group clusters. Have the music playing softly. Be in the room to greet each person. This is in contrast to instructors who rush in with a cup of coffee in their hand, apologizing for being a bit late. The key is to differ from the ordinary. A brain-compatible learning expert, Leslie Hart, urges us to "un-settle the set." Change refreshes and energizes.

Making lemonade from lemons is a challenge, but even small differences are notable. Create an atmosphere that invites anticipation. Truthfully tell your students that you are glad to be there. The atmosphere factor depends entirely upon the instructor.

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Resumen. Como haber experimentado una aula sugestopédica por su misma, la autora exploraba los factores fisiológicos y psicológicos que conducen a establecer una atmósfera sugestiva positiva que promueve el aprendizaje. Las resultas se discuten aquí.

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The Tiger on the Stairway

by

Donald H. Schuster

Abstract. This article presents and discusses three aspects of everyday communication: emotional tone in problem solving, the communicate-agree-reality triangle, and restimulation. A model of emotional problem solving is presented to understand and improve communication, including the Accelerative Learning classrom.

* * * * * * * * *

Introduction. At home in the evening you're sitting back in your favorite chair with your feet propped up, and reading or watching the news. You hear a noise behind you, look around, and there - on the stair behind you - is a tiger! He looks at you, flicks his tail back and forth, licks his chops...

You have a problem!

What do you do?

Stay put and complain? If you do, the tiger gets you pitilessly in one jump, one powerful blow, and you're a goner. Crying didn't work.

Run like crazy? With his strength and speed, the tiger in one quick jump catches you. Again you're a goner. Fleeing didn't work.

Hold a chair out in front of you? Pretend you are a tiger tamer? With his superior strength, the tiger bats the chair aside. Too bad for you; fighting didn't work either.

Study the situation inactively for a moment? In this inactive period, you may be successful in avoiding being a tiger meal. Then again, you may not and yet wind up as a tiger treat.

Consider several options? Hide behind the chair, run for the kitchen, yell for help out the window, or try to get your gun? How can you get more time, or can you distract him? Cautiously you toss the pen from your pocket or purse off to your side to distract him. When he glances at the distraction, you run to the kitchen and slam the door. Safe!

Size up the situation instantly? Toss your pen to one side for distraction, run to your unlocked gun closet, grab a loaded rifle, and bang! Dead tiger! Problem solved.

Most of us don't have to deal with tiger problems on a daily basis, but we do have communications problems every day whether we realize it or not. Accordingly, this fanciful tiger problem solving example can help us. The emotional tone of reactions above went from grief, fear, anger, inaction, caution to fast thinking associated usually with enthusiasm. This process is characterized both by the emotion and relative success of the problem solving.

This emotional tone scale of problem solving also has a communications aspect: Communication, Agreement and Reality. This CAR triangle varies with the emotions involved in talking about problems. People will resonate or talk most freely at one of these emotional levels in discussing their problems, every day or pressingly acute.

To improve your communications skill, listen for a moment to the other person you're talking to. What is the person's emotion? Where is s/he on the tone scale? Communicate deliberately at that same level of emotion or attitude. Agree on some common aspect of the other's problem. You can find some aspect to agree on, it may be trivial, but do find some aspect to agree on. When you agree on something in common, you share reality in that aspect and thus build rapport.

Then go around the CAR triangle again. Communicate anew to find something else to agree on, share reality and build rapport.

In going around the CAR triangle next time, pitch your communication one level higher than where the other person started. When the person responds at a higher level, communicate there for a moment, then go higher again. Finish if you can at the level of caution or enthusiasm. This process is called CAR tone level raising.

This is an easily learned communications model focusing on the basics of tone level, CAR and restimulation. Tone level is the expressed emotional mood or tone of a communicating person; CAR refers to Communication-Agreement-Reality as a triangle. Communication among people is enhanced when the communicators match tone level and emphasize first one aspect of the CAR triangle and then the others sequentially and cyclically. Restimulation refers to a person's remembering some early life stress experience and reacting similarly now without realizing it. As such, restimulation is much more common than generally realized, worsens everyday communication unnecessarily, and is a typical factor in a person's low emotional tone.

Emotional tone level affects all aspects of a person's behavior: self-esteem, affinity, awareness, logic, analytical level, sense of humor, responsibility, freedom, power, esthetics, honesty, reality, sex, children, and problem-solving.

Restimulation is an important source of noise in communication that is little recognized. Restimulation or redintegration occurs when some present stimulus triggers a past memory and brings into the present the old and now-inappropriate reaction. Let me give a lengthy example:

Many years ago we were invited to dinner by an old friend of my wife's. While the women were preparing dinner, I was in the backyard entertaining our friend's little boys. As kids do, the boys got tired of playing with an adult, and ran off into the neighbor's yard. Their mother observed this, leaned out the window, and hollered, "Don, go get my kids!"

Instantly I was angry, muttering something like, "If you want your ____ kids, go get them yourself." The very next minute I was wondering why I was so angry in the first place. I got to reflecting on why, and the answer was restimulation. It wasn't what the kids' mother had said, but the manner in which she said it. After all, asking an adult to watch over your kids for awhile is reasonable while you get dinner. The problem was her tone of voice: her demand was voiced exactly the same way and in the same tones my mother used to order me to do things as a teenager. Back then I resented my mother's unreasonable (?) demands as an adolescent, and as a young adult, I yet resented strongly uttered demands in that same tone of voice. The lady's tone of voice in present time had restimulated an adolescent reaction pattern to my mother's voice from years earlier: I had reacted the same way.

Here is the tone level scale for problem-solving:

1. Enthusiasm. Person has a swift grasp of a situation, an intuitive understanding of problems as they arise. Has the faculty of combining all the facts on a case and creating a new and different, but wholly adequate solution. If criticized, he/she accepts it readily if usable; otherwise, he/she is persistent in following through on thought-out plans and actions. Constantly searches for new viewpoints.

2. Caution. Approaches a new situation fast, but cautiously. Analysis of situation is deliberate and well-thought out. Appraisal of a situation is accurate on details and usually shows imagination in solution to a problem. Good on projects. Criticism if valid takes a short time to become effective. Persistence on given action is good and will withstand moderately adverse criticism. Solutions to problems tentatively tried out before being put into full use. Aware of possible rightness of different points of view and conservatively agrees with them.

3. Indifference. Person is ok in grasping a problem or new situation. When reached, analysis is reasonably accurate. May not observe and include all pertinent details. Quite capable of action, but relatively

inactive. Solution to a problem will eventually be worked through in practice; idle moments and periods of poor concentration can make execution of problems drawn-out. Shows persistence in carrying out his/her solutions, but may easily be discouraged by criticism. Somewhat indifferent to conflicting viewpoints; may or may not agree/disagree.

4. Anger. Interprets new situations and problems as menacing; reaction can be antagonistic and sometimes angry. Most details of situations are analyzed correctly, but the overall situation may be misinterpreted. Hasty analysis leads to a jumped-at solution. Solution is rough, and will have an element of personal victory for this person. On projects, person starts strongly, but without supervision gradually peters out. Criticism may be talked down and have no immediate effect on action. Later he/she may adopt criticism into his/her actions, but as own improvements. Persistence on projects is sporadic.

5. Fear. Reacts to a new or strange situation by withdrawing. Recognizes the problem, but makes no great analytical effort to solve it. Tries to appear to solve the problem while actually not. Person may glibly pass the problem on to someone else after a serious attitude of studying it. This pleasant

fast-talk usually covers up the fact that the person did not solve the problem. Person also can avoid the problem by concentrating poorly. Can solve the problem, but is flighty. Doesn't really accept criticism; may shrug it off. Shows an indirect anxiety about questioning and an undue concern over doing work correctly. Person does routine jobs ok, but persists poorly where there are many details and changes.

6. Grief. Person is at a loss when a problem arises or is unaware that a situation is different than the previous one. Solutions to problems are haphazard due to limited awareness of details. Criticism or remarks are literally accepted. Person is confused easily and strange situations upset him/her. Likes to talk about troubles (crying or complaining) to people and superficially try to solve problems by others' opinions. Viewpoints of others are easily accepted. Person is fair in routine positions, but changes and details confuse him/her.

Discussion. These ideas of tone level, CAR and restimulation were new to me back in 1950 when I encountered them in Hubbard's *Dianetics*. These useful ideas came from an unusual source with the result that they are not well known in educational or psychological circles. Forty years of using and modifying these concepts have shown their usefulness as tools to help interpersonal relationships. I have passed these ideas on to family and friends, and I am pleased to give them the wider audience they deserve (Schuster, 1994). These ideas are nuggets of gold from an otherwise usually discredited source. Teachers will find all three ideas helpful in handling classroom problems as they arise on the spot. In particular, restimulation can be analyzed, understood and ameliorated quite easily through these concepts. Go get 'em, tiger!

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Resumen. *Este artículo expone y discute tres aspectos de la comunicación cotidiana: el tono emocional en resolviendo problemas, el triángulo comunicar-acordar-realidad, y reestimulación. Un modelo de resolver problemas emocionalmente se presenta para*

entender y mejorar la comunicación, encluyendo la aula acelerativa.

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Recent research in second language acquisition supporting accelerated learning techniques

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Abstract. When first introduced in the United States, Lozanov's theories were met with skepticism by many professors and researchers in the area of Second Language Acquisition (SLA) research. However, over the years the results of SLA research have tended to support Lozanov's ideas. Much of the SLA research involves hemispheric specializations, learning environment, suggestion, motivation, and personality. These are areas that have been prominent in Lozanov's theories and research over the past 30 years. This paper addresses the recent SLA research that supports Lozanov's theories.

Introduction. Dr. Georgi Lozanov has spent over 30 years researching and applying his theories concerning suggestion in a wide range of learning contexts. . His research results demonstrating that students could learn up to 50 times faster than with traditional methodologies were dramatic. However, due to Lozanov's geographical and political isolation and also to the difficulty in translating the professional jargon of East European social sciences (Dhority, 1991), his work was not immediately popular in the United States. Meanwhile, there has been a great deal of research in Second Language Acquisition in recent years. Much of this research supports Lozanov's theories. This paper will address the recent SLA literature that supports Lozanov's theories in the areas of hemispheric specialization, environment, suggestion and personality.

Hemispheric Specialization. (Lozanov (1976) promoted the concept of whole brain learning. He noted that traditional classroom techniques usually emphasized verbal, linear, and sequential approaches to learning associated with the left hemisphere. He proposed that by addressing non-verbal communication, such as gestures, music and visualization in the learning process, teachers could increase the learning rate and retention of their students. Recent research in Second Language Acquisition also addresses this issue. Hartnett (1975) defines right and left hemisphere specialization as follows: The left hemisphere involves the logical operations and abstraction from field. The right employs appositional thought and simultaneous processing. He discovered that images are perceived by the right brain even when people can't describe or name them. He proposes that hemisphere specialization may offer a neurological basis for field independence or dependence. Field independent and analytic would be left hemisphere dominant, while field dependent and holistic may be right hemisphere.

Krashen's stage hypothesis (Galloway, 1978 and Oller, 1981) supports Lozanov's theories concerning hemispheric specialization. Krashen's research shows that the right hemisphere is involved in language learning especially in the early stages, whereas we have usually associated the left brain with language. In addition, Schneiderman and Wesche (1983) found support for the role of right hemisphere in early stages of second language acquisition by adults. Leslie Hart (1983) also researched the human brain in relationship to educational settings. His conclusion is that the typical educational environment is not brain compatible. He lists factors that should be considered when designing educational experiences:

1. The brain operates in a nonlinear manner, receiving and processing information simultaneously and multimodally.

2. The brain functions well with high volume input.

3. Speech, providing the learner with feedback and the opportunity to express him/herself in relationship to the material learned, is a necessary condition for optimal learning.

4. Feedback must be reality based and not teacher originated.

5. Risk, as opposed to threat, is an essential element in optimal brain use. (Hart, 1983).

In Suggestopedia, one element of whole brain learning involves directing non-conflicting messages to both the conscious and the subconscious. This has been termed "double planing" (Dhority, 1984). Teachers are trained to ensure that their words, gestures, intonation, and facial expressions are conveying a message of acceptance, dedication and warmth. Techniques that reach both verbal and non-verbal planes of communication aid in optimal learning. Many of the right brain techniques used in Suggestopedia, such as brain teasers and music, are useful exercises in creative thinking, exercises that require the student to change perspective or employ an alternative mode of problem solving. These exercises are beneficial in any content course because they encourage the student to think creatively and they open the mind to new ways of processing information.

Environment. The learning environment is an important aspect to Lozanov's research. One of the principles of Suggestopedia is that an attractive and comfortable classroom increases learning because students often are affected, either negatively or positively, by elements of the environment (Caskey, 1980). Prichard and Taylor (1980) list conditions for maximizing the suggestive impact of a classroom. These include the seating arrangement, which should allow all students to see each other and should place the teacher in a position of authority. Lozanov (1979) documented improved learning when visual stimuli were placed in a classroom without the instructor's drawing conscious attention to them. In addition, music is used extensively in superlearning to control the environment. While physical environment is sometimes difficult to control in American classrooms, much can be done through mental environment.

Schuster and Martin (1980) investigated the effects of biofeedback induced tension or relaxation during learning and testing. Their general conclusion was that students learn better when they are relaxed thoroughly and consistently in the classroom than when they are anxious and nervous. Balevsky (1975) studied the relationship between the frequency of neural firing and short term memory. The results indicated that short term memory was increased when electrical activity was affected by calming suggestions and a tranquil environment.

Suggestion. Lozanov (1976) defined suggestion as a constant communication factor that through subconscious mental activity, can create conditions for tapping the reserve capacities of the brain. He advocated tapping these reserves by presenting affirmations of pleasant, easy learning while the student was in a relaxed state of mind. Suggestion exists in all human conditions, and teachers simply try to develop an awareness in their students that' will help them manipulate the suggestions beneficially. Dhority (1984) links Lozanov's research with neurolinguistic programming by pointing out that both disciplines refer to "barriers" to learning that serve to protect the students from change. Both disciplines reiterate that these barriers cannot be overcome by confrontation, but rather by harmonization, or "establishing rapport". In other words, many students have developed negative learning habits and attitudes, so the suggestions are often actually used to desuggest these inhibitions of learning. . The suggestions can be either overt, with the teacher's stating to the students that learning English is easy for them, or covert, expressed in the teacher's expectations and paralanguage. Another use of suggestion is the type of frequent, low stress tests found in the method. Through these, the students can see their progress without the fear of a grade. The realization of progress suggests to the students that they are good learners and increases their motivation (Ostrander and Schroeder, 1979).

One aspect of Lozanov's concept of suggestion may be motivation. Several Second Language Acquisition researchers have studied motivation recently. Henning (1983) posits that success may depend on interest. Goldstein (1987) stressed the importance of socio-psychological and affective factors, pointing out that students have personal goals and reactions to language use situations. The research on motivation has moved in the past years from extrinsic (external forces of motivation popular in behavioral modification) to intrinsic (a feeling of competence and self determination). Gardner (1988) makes a distinction between integrative and instrumental motivation. Integrative motivation involves a sense of community and identity with the language and culture. Instrumental motivation stems from external factors, such as the need for a job. Integrative motivation can be affected by social and psychological distance, social dominance, integration patterns, enclosure, cohesiveness, size, cultural congruence, attitudes and intended length of residence. Strong's research (1984) shows another element of complexity: successful students became increasingly motivated rather than the other way around. Another aspect of motivation is the concept of "empowerment". Recent research and methods attempt to empower learners, rather than fill the blank slate of students' minds. Pennycook (1989) calls upon teachers to give students control over their own lives by involving them in the process of learning a language. Motivation is strongly linked with student success in Second Language Acquisition. Superlearning strategies, such as suggestion, focus on intrinsic and integrative motivation.

Personality.- Recently, Lozanov has focused his research on an area he calls "personality". There has also been a large amount of research in the areas of cognitive style and learning style in the field of Second Language Acquisition. Larsen-Freeman (1991) points out that learner's cognitive styles are often presented as dichotomies:

field dependence/ independence, reflectivity/ impulsivity, aural/ visual and analytic/ gestalt. But these are not truly opposites, as learners can exhibit a tendency to one or the other. A popular distinction of cognitive style is field dependence/independence. People are field dependent if they are unable to extract an element from its context. Most available research offers support for a relationship between field independence and second language learning process (Larsen-Freeman and Long, p. 193).

A second distinction is category width: Broad categorizers and narrow categorizers display a tendency to include or exclude inappropriate items. Brown (1973) and Schuman (1978) hypothesized that broad categorizers would likely commit many errors of overgeneralization; narrow categorizers would formulate more rules than are necessary. They point out that these tendencies may be related to a learner's degree of risk taking. A third distinction is reflectivity/impulsivity. Reflectivity indicates a tendency to mull over questions. Students on the impulsive side of the scale would be more willing to take a guess (Brown, H.D., 1980). Fourth, Hatch (1974) and Peters (1977) categorize learners as analytic or gestalt. Their research discovered that some children analyze by components, while others take a more holistic approach. It is important to remember that all learners have both abilities in these various distinctions. Superlearning methodologies accept all of these distinctions by creating a learning environment that allows each learner to operate from his/her dominant style while providing opportunities to expand skills in other cognitive and learning styles.

There has also been research concerning learning styles. For example, Levin (1974) discovered that in terms of aural/visual tendencies, many learners are bimodal, but for 25% of the population, the mode affects learning. In another learning style study, Fillmore (1982) researched the extroverted/introverted scale. Interestingly, introverted children performed better in teacher oriented classrooms. Extroverted children performed better in student centered classrooms. Superlearning classrooms provide a balance between teacher-centered and student-centered activities to accommodate both styles. [illegible] (1982) creatively categorized learning styles into beaders, braiders and orchestrators. Beaders string words together, braiders group chunks and orchestrators use sound patterns. In another study concerning affective factors, Ely (1986) studied oral participation and learning outcomes. He measured risk-taking, sociability and discomfort. the results indicated that risk taking predicted classroom participation. In turn, participation predicted oral correctness. He suggested that some students need to feel more psychologically comfortable before they will take linguistic risks. Adding to the research in this area is Saville Troike's (1985) study on L2 private speech. "The kinds of interactions that can contribute to L2 acquisition go beyond the two way verbal interactions. "Teachers should expect a silent period in which children are engaged in sound, form and meaning. Teachers should provide opportunities for meaningful verbal interaction as well as non-verbal interactions. A principle of superlearning is to respect and understand each student's individual tendencies and to provide a learning environment that accommodates all styles.

Strategies of Learning. Another point of focus in the research on the learner's learning strategies. It seems that learners taught learning strategies do better than those with no learning (Larsen-Freeman, 1991). Rubin (1975) added to the research on learning strategies. His research results showed that willing and accurate guessers were highly motivated to communicate.

practice and monitor their own speech and the speech of others. Chesterfield and Brown (1985) demonstrate that learners' strategies change over time. Wesche (1977) concludes that in the classroom, both diversity of observed learning activity and the relative amount of such activity characterized the better students (Wesche, p.363). This research supports superlearning techniques of providing a diversity of activities.

Brown (1980) states that learners are taught strategies of learning as well as the target language. The following is Brown's list of effective learning strategy activities, and how they help students with differing learning and cognitive styles:

1. Guessing games and other communication games help students realize that it's important to be a risk taker and to lower inhibitions.

2. Encouraging students to go beyond classroom assignments teaches them that it's important to set their own goals for their own purposes.

3. Using conceptualizing activities shows students the importance of seeing the "big picture", and of not always focusing on minute details.

4. Directing students to share their knowledge and ideas, or to talk in small groups demonstrates the importance of

socioaffective strategies of cooperative learning.

5. Praising students for good guesses and for trying out the language in novel situations teaches them that their intuitions about the language can be reliable sources of knowledge.

6. Deliberately withholding a direct correction of error, or letting students correct each other's errors, helps make their mistakes work for them rather than against them.

All of the activities in Brown's list are typical of the activation phase of Lozanov's method.

The work of Krashen (1982), Terrell (1983), and Asher (1988) has supported and augmented Lozanov's theories, especially in terms of classroom activities. Superlearning teachers incorporate Krashen's five hypotheses (acquisition vs. learning, natural order, monitor, input, and affective filter) into the design of their courses. Asher's Total Physical Response is easily integrated into second language classrooms, especially for the early stages of language acquisition. Terrell's four types of acquisition activities (content, affect/humanistic, games, and problem solving) are an integral part of the activation phase of superlearning.

Recent research in Second Language Acquisition has come to use the term "communicative" to include a variety of classroom methodologies. Superlearning fits into this category of methodologies in its evaluation procedures and its focus on learning skills as well as content. Savignon (1991) states, "Communicative language teaching (CLT) has become a term for methods and curricula that embrace both the goals and the process of classroom learning." (p.263). The focus is on the learner. The learner is considered a partner in the learning process, including self-assessment of progress. The framework for the course develops from the learners' communicative needs. Evaluation is a qualitative, rather than quantitative, assessment of discrete linguistic features. As Savignon (1991) points out, evaluation must be changed for there to be any significant curricular changes. One technique of evaluation is portfolio assessment rather than tests. This supports the many low-stress, self-corrected tests in superlearning and the culmination of the evaluation process in a final project or play.

Another outgrowth of learner-focused theories is task-based teaching. Task-based learning began in mainstream education. Nunan (1991) outlines the following features of task-based language teaching. They are very similar to principles of superlearning:

1. An emphasis on learning to communicate through interaction in the target language.
2. The introduction of authentic text into the learning situation.
3. The provision of opportunities for learners to focus, not only on language, but also on the learning process itself.
4. An enhancement of the learner's own personal experiences is an important contributing element to classroom learning.
5. An attempt to link classroom language learning with language activation outside the classroom (p.279).

In general, research in Second Language Acquisition has moved towards a focus on the learner and the learning process. At the same time, Lozanov is focusing his research on "personality" or individual styles of learning and how to use them to accelerate learning.

Conclusions. Several researchers, faced with the growing body of research describing learning and cognitive tendencies, are attempting to create several principles that will aid teachers in addressing the diversity in their classrooms. Wilga Rivers' (1992) ten principles, an outgrowth of the recent research, can easily apply to accelerated learning as well as traditional classrooms:

1. *The student is the language learner.* Superlearning creates a non-threatening environment so students' natural desire to improve thrives.

2. *Language learning and teaching are shaped by student needs and objectives in particular.* The new personalities and the creativity built into the activation exercises allow the students to bring their expertise and personal objectives to the learning situation.

3. *Language learning and teaching are based on normal uses of language, with communication of meaning (in oral or written form) basic to all strategies and techniques.* Accelerated learning texts present the target language naturally so the student is exposed to natural language. The expected production is based on the learner's proficiency level.

4. *Classroom relations reflect mutual liking and respect, allowing for both teacher personality and student personality in a non-threatening atmosphere of cooperative learning.* Accelerated classrooms allow students to bring their own expertise to the classroom. All styles and learning strategies are respected and built upon.

5. *Basic to use of language are language knowledge and language control.*

6. *Development of language control proceeds through creativity, which is nurtured by interactive, participatory activities.* These are an excellent support for the activation exercises in accelerated learning classrooms. The activities are presented in order from structured to more creative use of the target language.

7. *Every possible medium and modality is used to aid learning.* The superlearning cycle includes mnemonic techniques such as aural, visual and kinesthetic activities. Accelerated learning teachers present content through a variety of techniques that appeal to all types of learners.

8. *Testing is an aid to learning.* Superlearning employs many low stress tests that provide the learner with immediate feedback.

9. *Language learning is penetrating another culture; students learn to operate harmoniously within it in contact with it.* The visualizations and new personalities expose the learner to the new culture from the first class.

10. *The real world extends beyond the classroom walls; language learning takes place in and out of the classroom.* In addition, the learning process extends to other fields of study. Accelerated students report improved memory and learning success in other subject areas.

The body of literature supporting Lozanov's research and the resulting classroom techniques and methodologies is growing. Many of the theories are validations of techniques that good teachers have intuitively relied upon for many years. The recent research, including Lozanov's, could translate into classroom practices that will enable students with all learning styles to more effectively learn languages as well as other subjects. "the methodologies of the past have all been similar in that they focus on the strengths of one learning style or personality. An overriding benefit of the recent research is that teachers and researchers will be more aware of the individual differences in motivation, learning styles and needs. It is possible to develop and use classroom techniques that address these individual differences, thereby enhancing each learner's ability to blossom in the learning environment.

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Resumen. Al introducirse en los Estados Unidos, las teorías de Lozanov se encontraron con escepticismo por muchos profesores e investigadores en la área de adquisición de una lengua segunda (ALS). No obstante, sobre muchos años las resultas de investigaciones en ALS por lo tanto han soportado las ideas de Lozanov. Mucho de la investigación ALS trata con la especialización hemisférica, el ambiente de aprender, la sugestión, la motivación y la personalidad. Estas son las áreas prominentes en las teorías de Lozanov e investigaciones en los últimos 30 años. Este artículo examina la reciente ALS investigación que soporta las teorías de Lozanov.

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Book review of Eric Jensen's *The Learning Brain,* reviewed by Lyelle Palmer, Winona State University.

Interpreting research for application in the classroom is an immensely important and energizing enterprise in any field, including accelerated learning. Have you ever wished that, when people discuss brain advances in the context of enhancing learning abilities, specific references would be given, rather than vague allusion to "somewhere" "somebody" has documented research? Have you ever been asked to provide a citation for documentation about a tenet of your beliefs about accelerating learning rates of students and couldn't remember the source? Have you ever thought that "someday" I'll systematically organize what I know so that I can access it and apply it in my training? If you have ever asked yourself these or related questions about summarizing or itemizing the research base which supports the field of accelerated learning, you have a stimulating treat awaiting you in Eric Jensen's latest work, *The Learning Brain.*

Eric has an extraordinary publishing record in accelerated learning, having authored *Student Success Secrets, Superteaching,* and *The Learning Success System,* as well as being co-founder of SuperCamp and providing training in brain-based pedagogy. His Turning Point for Teachers organization provides well-designed print and media resources for teachers and trainers as well as workshops, and his conference presentations are always inspiring. Eric has been involved with the effective teaching and training movement since its inception so he knows the literature thoroughly.

The documentation he has chosen is organized into sixteen chapters, including: physiology & biology, emotions and learning, timetables and rhythms in learning, strategies and styles, memory and recall, different learners, intelligence, states of attention, toxins and hazards, music, stress, prenatal & preschool, motivation and rewards (including a section entitled, "Rewards can Kill Intrinsic Motivation"), sex and gender, and environments. Each chapter contains 6 to 23 one-to-two page sections on a specific documented topic, with an example, the "Action Step" implications of the research, and, in many cases, "Best Bet Resources" for further reading. For example, page 250 reports that "Talking to Babies Builds Better Brains," and cites Janellen Huttenlocher of the University of Chicago: "At 20 months, babies of talkative mothers knew 121 more words than infants of untalkative mothers, and by two years, the difference was 295 words. She says that the babies listen, even though they can't understand. "The "Actions Steps" are to "educate working parents, ..." and to "provide alternatives to insure that the children are getting attention and language interactions." Under "Congruency Critical to Presentation," presenters are invited to "Practice your non-verbals," and a "Best Bet Resource" is the book, *Present Yourself,* by Michael Gelb.

The research authors cited are numerous, and include many familiar accelerated learning authors in addition to neuroscientists and others who have produced astounding documentation. For example, Canadian researchers Klein and Armitage, in a section of "Brain Modal Switchover Every 90 Minutes," (page 55), found a daily verbal/spatial right/left brain change in "...16 cycles lasting 90 minutes each," and Ehret found that caffeine "...disrupts the body's own natural cycles," and it is "...best to drink decaffeinated coffee or tea."

Those interested in consulting the primary sources will find the citations in the bibliography.

In reviewing this book, I found myself creating tabs for many topics to be revisited in the future. The author has compiled, in easy reading form, an extension of the basic and helpful abstracts expected of graduate students in literature reviews. These reviews are more fluent than scholarly reviews, however, since no statistics are given. Blank pages are provided for the many comments and notes that readers will find themselves making in response to the text.

One of the great needs in education historically is for research findings to be digested and applied in the classroom. I expect that readers will find this collection a valuable handbook which can be absorbing and stimulating, and perhaps this work will present a new and highly palatable format for practical interpretation of research to educators. Writers take note!

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